

COMMERCIAL CAR JOURNAL

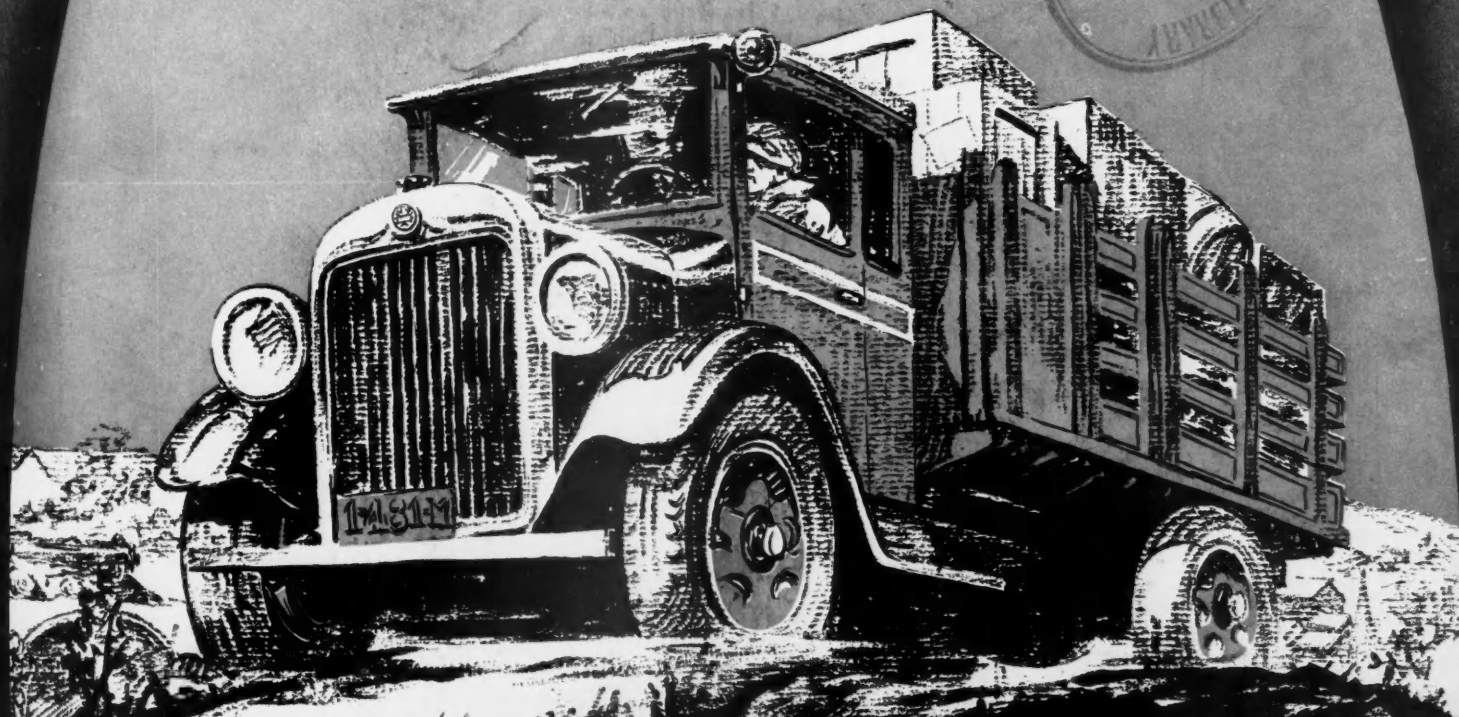
and OPERATION & MAINTENANCE

APRIL 1929



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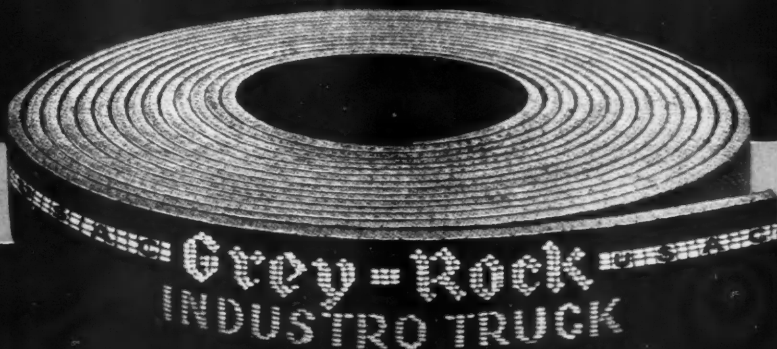
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Entered as second-class matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879.

Vol. XXXVII Philadelphia, April, 1929 No. 2

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Published Monthly by

CHILTON CLASS JOURNAL COMPANY

Chestnut and 56th Streets, Philadelphia, U. S. A.

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Commercial Car Journal

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Telephone.....Sherwood 1424 Philadelphia

G. C. BUZBY, Vice-Pres.

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New York—239 W. 39th St., Phone Pennsylvania 0080

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Owned by United Publishers Corporation, 239 West 39th Street, New York;
ANDREW C. PEARSON, Chairman, Board of Directors; FRITZ J. FRANK, President; C. A. MUSSELMAN, Vice-President; F. C. STEVENS, Treasurer.

SUBSCRIPTION RATES

United States and Possessions	\$2.00
Canada	3.00
Foreign	4.00
Single Copy Price40

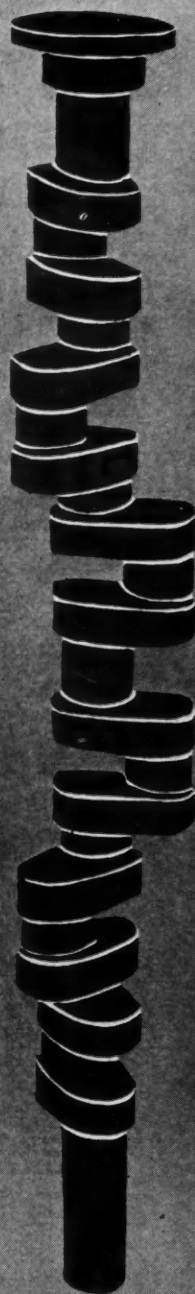
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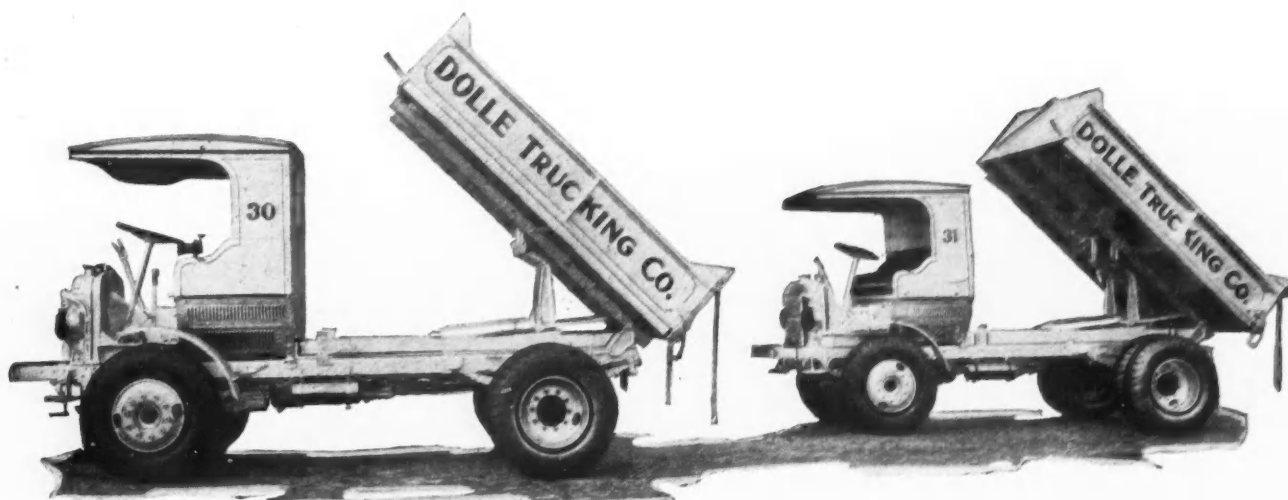


IN
WELL KNOWN
MOTORS SINCE
THE BEGINNING
OF THE
INDUSTRY

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THE CRANKSHAFT
MAKERS
WORCESTER, MASS.
HARVEY, ILL.

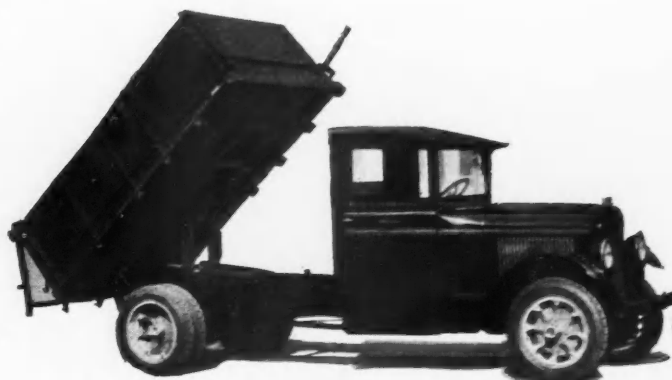
April, 1929



Two Autocar Trucks, equipped with Model 6UB St. Paul Underbody Hydraulic Hoists for the Dolle Trucking Co. by the Marion Body Co. of Columbus, Ohio. This equipment can dump the load in a few seconds with a minimum of power and a tireless ability to function at full capacity in uninterrupted operations almost without end.

In Step with Dump Trucks

and not like the soldier who never was promoted because, as his mother explained, "he was always in step but the company was never in step with him." St. Paul Hoists are always "in step" with every make and model of truck. Whether you have a new truck, an old truck, or require a special truck, there's a St. Paul Hoist with the power and strength to meet your requirements and to "keep step" with them.



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VOL. XXXVII

COMMERCIAL CAR JOURNAL

and OPERATION & MAINTENANCE

NUMBER 2

PHILADELPHIA, APRIL, 1929



THE great field of road construction, activity in which becomes general at this time of the year, is one of the chief vocations in which the truck is indispensable. Road building, first stimulated by the advent of motor vehicles and then fostered by the ever-growing demands of modern social and business life, has developed into a gigantic industry, which lays 40,000 miles of highways and spends more than 500 million dollars annually. In highway maintenance, a service in which the truck plays a similarly essential part, another 500 millions is spent.

Road construction and maintenance are vital characters contributing to the success of the modern drama of highway transportation, and the truck gives them invaluable support.

DO TRUCKS RATE

THE question of whether a combination truck and passenger car dealer should have a separate sales staff to sell the commercial vehicles has been answered in the affirmative by many dealers in the large cities. There was a time before the truck market expanded to prodigious proportions that even these dealers were content to let the passenger car salesmen sell trucks, but experience taught the more progressive dealers that truck selling was a specialized business and that it required concentrated salesmanship if the volume potential were to be satisfactorily realized.

This same question, however, has not been given as careful consideration by combination dealers in the smaller centers, and wherever it has been pondered it has been answered negatively on the prime premise that a special truck staff would prohibitively increase the selling expense. There are many cases where this would be an undeniable fact and a very valid objection. But there are many others where an affirmative solution on a small scale might be a very profitable move.

Fundamentally



A SEPARATE STAFF?

Opinions of Executives Favor Establishment by Combination Dealers of Selling Force Specializing on Trucks

By George T. Hook

the same arguments in favor of a separate truck staff apply to small towns as to the large cities, and on this account the combination dealers in the lesser localities may find sufficient inspiration in the favorable opinions of automotive executives in the big centers of distribution to warrant an experiment that may give them a fuller and better appreciation of the real potentialities of the truck market. At the very least the opinions should convince the small-town dealers that whereas it might not be entirely feasible to effect a division of the selling staff, business circumstances viewed in the light of such illuminating opinions might warrant the selection of one man or more to give his undivided attention to the truck end, acting at the same time, perhaps, in an advisory capacity with the salesmen dividing their effort.

Those dealers in the large cities who, though possessing sufficient business to justify the separation move, have

nevertheless failed to make it, should find enough unquestionable arguments in the opinions that follow to sway them.

"My opinion," said T. E. Swain, manager of the Oakland Cal., branch of the Reo Motor Car Co., "is that the two staffs should be absolutely separate. These are two entirely different fields. The passenger car salesman is thinking constantly of the advantages of that particular kind of vehicle. He presents its luxuries, its appearances and similar attractions. His appeals are directed in almost every case, at some time during the negotiations, to women. He must keep himself in the frame of mind of a well-groomed person, accustomed and ready

A GROUP of passenger car salesmen was asked to give its reasons why a good passenger car salesman is invariably a frost when it comes to selling trucks. In substance the replies were somewhat as follows:

"I'm afraid of a truck deal. I'm afraid of the many questions that the truck buyer will fire at me. He wants to know specifications, comparative specifications of all trucks. He wants to solve his transportation problem on a mathematical basis. I don't feel competent to answer his questions. I'm too busy selling passenger cars to make a thorough study of truck problems. Selling to the whole family is entirely different from selling to a hard-boiled purchasing agent or a fleet operator."

to talk to cultured, sensitive people.

"The truck salesman, on the other hand, is more of an engineer. He has to think in statistics and to know commercial businesses. He must be acquainted with the details of the business of the man whom he is selling in order to analyze his problems for him.

"Not only so, but I believe the commercial car selling business should be further divided, with respect to business classifications, because it is impossible for one salesman to know enough about all of the business represented by the people who sell trucks. Each man in truck selling should be a specialist in one division."

"A dealer certainly should, absolutely and without question, maintain separate staffs of salesmen for selling trucks and passenger cars," said J. T. Jenkins, manager of the truck department of the Oakland, Cal., office of J. E. French Co., Dodge Brothers agents. "I am referring, of course, to the metropolitan dealer who has sufficient business to warrant it. The one-car dealer in a small town no doubt could not afford it.

"The two lines are as different as night and day. If a man is handling both he is bound to favor one or the

other. The dealer cannot begin to get as much service or as much business from two such men as from two who specialize in their respective fields. This is an age of specialization, and it applies as much here as elsewhere."

"By all means 'yes,'" was the favorable expression of R. E. Davis, secretary and general manager of the O'Brien-Davis Auto Co., Omaha, Neb., Dodge dealer. "We've been through the mill. In fact, we've tried every way of selling and not until we took the bit in our mouths and fought for the plan of special truck salesmen to devote their entire time and attention to truck sales did the sales mount to the satisfactory volume that we enjoy today.

"A good salesman in the motor truck line must make a study of a big volume of detail. He should know it so well that he is never stumped by any question that the prospect might present. There's got to be real concentration on the subject, and we've learned from experience that this is impossible when salesmen are switched about from department to department. In selling a truck the salesman must understand the prospect's needs, and he should know these needs much better than the prospect does himself, and be honest in his convictions regarding them. In fact, he must be a transportation specialist to a degree far beyond that necessary when it comes to selling cars for pleasure and commercial traveling."

Paul G. Clark, president of Paul G. Clark, Inc., Colorado Springs, Colo., Chevrolet dealer, holds that a dealer should have, in addition to his passenger car staff, at least one man who is a specialist in truck selling. He should spend his time canvassing the truck field and should be available to the passenger car staff when one nails a prospective truck purchaser.

"My chief reason for this," he said, "is that the selling of trucks and the selling of passenger cars requires entirely different methods. Passenger car selling is an emotional problem. It requires a man with a sense of the dramatic; one who can weave words of glamour and romance into his talk. A truck salesman doesn't get far with

such a method, and therefore he has to be a man of a different temperament. The man who is in the market for trucks wants facts and he wants them cold. The man who sells him needn't have an ounce of imagination. He sells by studying his prospect's business to discover what the prospect needs to operate most efficiently and economically and then to help him buy. In other words, the problem of the truck salesman is one of pure mathematics."

E. F. Nygaard, manager of the truck department of the J. M. Oppen Co., Omaha, Neb., Reo agency, is a strong advocate of separate sales staffs. His firm also has a passenger car division, but the truck department operates entirely independent of it. The only time there is any connection between them is when one hears of a prospect in the other's field. This information is passed along.

Mr. Nygaard defends this system with the argument that the passenger car salesman must learn salesmanship for passengers while the truck salesman must learn salesmanship for customers who want to transport a commodity. The two staffs get their cues from different sources, and their sales arguments are distinctly different. To do a real good job a salesman must master the elements of one line, and if he tries to mix the two he is more than likely to be a failure at both.

"If our truck salesmen weren't on the job our truck volume would look pretty sick," Fred Lamping, of the Lamping Motor Car Co., Seattle Reo distributor, confided. "We have one man on our staff who seems equally at home in both the truck and passenger car fields, but he's an exception to the rule."

The reason for this condition was convincingly answered at the establishment of C. H. Wells, Inc., Seattle Chevrolet dealer. T. H. Kirksey, in charge of truck sales for this company, expressed the same opinion as Mr. Lamping. Then he called over a couple of passenger car salesmen from the floor. "Why is it that a good passenger car salesman is a frost when it comes to selling trucks?" Mr. Kirksey asked them. After the first two men had answered, two more drifted in, and the same question was put to them. Each man admitted the weakness. The reasons given by each man were singularly alike and are given in box form on page 15.

It may be argued that this lack of knowledge of the truck line by the passenger car salesman is a weakness that can be overcome. Mr. Kirksey has tried it, and given it up as a bad job. He depends on his four truck salesmen to bring in the truck volume, though he still appeals to the passenger car men every week. Every passenger car salesman in the organization is supplied with truck information, given prospects and urged to make truck sales. But they don't—just a few exceptions. Mr. Kirksey has come to the conclusion that the two types of appeal necessary in talking to the passenger car prospect and the truck prospect are so widely different that the average salesman can't carry the two loads on the same shoulders.

"Certainly we keep our commercial car sales crew distinct from the passenger car sales force," stated W. O. Strausbaugh, head of the Youngstown, Ohio, Dodge agency bearing his name. His firm sells about one and a half million dollars' worth of vehicles every year, and his truck business is approximately 25 per cent of this amount. This truck business, he declared, has been largely built up by making every truck salesman a specialist to an extent that would be impossible, or at least impractical, if the salesman also were interested in selling passenger cars. Mr. Strausbaugh insists that every truck salesman be a hauling expert. He must know more about the trucking problems of a lumber dealer, for instance, than the lumber dealer himself is likely to know. He must be prepared to unsell a prospect on one type of truck when it is clear that another type will serve him better.

In contrast to this is the opinion of Frank B. Smith, president of the F. B. Smith Chevrolet Co., of Youngstown. He said:

"We used to have separate crews, but we discontinued our distinct truck sales force entirely. Not all our salesmen carry sales literature on both passenger cars and trucks. We keep one truck specialist who looks after certain truck details around the place here, but we find that maintenance of separate sales staffs did not bring more sales than the present combination system."

A. W. Marksheffel, president of the Marksheffel Motor Co., Dodge dealer of Colorado Springs, Colo., entertains a somewhat similar feeling.

"Probably it is a very good thing to maintain separate staffs where the field is large," he said, "but we have not found it advisable in this comparatively small territory for the reason that salesmen in a small territory have so many friends in both the passenger

car and truck fields that are live prospects. The prospect-friend buys from his salesman-friend where he would not from a stranger no matter how excellent a truck salesman. However, we have one man who is stronger on trucks than on passenger cars, and although he sells both he pushes the truck end. Nevertheless the other salesmen are continually active in truck selling. I think that even if I had a larger dealership and some of my passenger car salesmen could sell trucks, I would want them to. The methods of selling are not so different that one man cannot handle both."

"Salesmen can handle both passenger cars and trucks, but separate staffs for each is the better arrangement if there is a volume of business which warrants specialized truck salesmen," said R. W. Leach, vice-president and treasurer of the Curtis Auto Co., Milwaukee Reo dealer. "The way we work it is to have five salesmen on passenger cars and five on trucks. There is no dividing line, however, as to where a truck salesman, for example, should stop selling passenger cars. Our group of salesmen is under one sales manager."

"Most certainly should there be different and separate sales staffs," declared George F. Wroten, of Wroten-Hundley Motor Co., San Antonio, Tex., Dodge dealer. "The sales talks are entirely different and it is hardly fair to expect a salesman to be equally effective in both lines. There are certain transportation problems connected with trucks that can best be explained to prospects by salesmen who have accurate and up-to-date information to speak from."

S. A. Stephens, president of the Buffalo Dodge dealership of the same name, maintains "it is absolutely essential to success in a large way that separate staffs be maintained."

"We have five truck salesmen," he said, "including the truck sales manager who closes many of the deals. If separate staffs are not maintained invariably one phase of the selling will be accented to the disadvantage of the other. Of course, in small country places this sort of thing cannot be done, but in large centers separation, I consider absolutely necessary to success and profits."

In considering the question the opinions of executives of exclusive truck establishments must be of value because they are extremely well aware of the
(Turn to page 24, please)

SELLING MILEAGE

Motor Mileage Corp. Furnishes and Maintains Trucks on Long or Short Term Contract Basis

TRUCK rental plans, while varying greatly in detail and scope, have in general the same underlying principle. Men of experience in motor transportation associate themselves in an organization to provide truck service on a mass production basis. This service is offered in large or small quantities to business men requiring trucks occasionally, and to those having constant use for trucks in connection with a business in which their chief interest is centered.

To serve both of these classes, but particularly the latter, an organization, known as the Motor Mileage Corp., has been formed in Philadelphia with a branch office in New York. For the present the management plans to confine its activities to these two cities. Besides selling mileage, this corporation also provides advisory service without charge to patrons on matters pertaining to delivery problems and driver handling.

Mileage is sold in the form of long term truck service and daily or hourly drive-it-yourself service. In either form Motor Mileage furnishes trucks and assumes all charges for operation and maintenance, including gasoline and oil, garage storage, liability insurance, tires and maintenance, but excluding drivers. In case of accident or breakdown Motor Mileage provides road service or, when necessary, dispatches an emergency truck to complete delivery. Service is sold on a two or three-year contract basis, which provides a flat weekly charge plus a mileage rate; or on a straight mileage rate in daily drive-it-yourself service. Long term service, however, is the company's

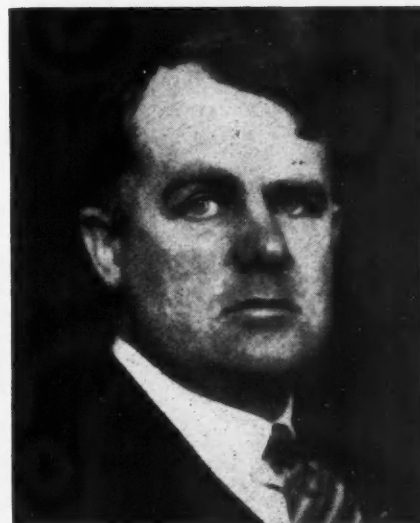
specialty. Only three makes of trucks are offered on a standard rate to all patrons, they are the Ford A 1½-ton, the ¾-ton G.M.C. and ¾-ton International Harvester, which are quoted at a flat rate of \$15.50 per week plus seven cents a mile.

Rates are established by the company's engineers and are not based on the prospective user's cost records. The engineers study the operation, nature of the load, points of delivery, condition of delivery area, average mileage

and determine the make and capacity of truck required. The contract is based on this study. Since the operating conditions of no two businesses are alike the rates and time-periods of contracts are not constant. Methods of cost estimating also vary with the operation. For example, method of calculating depreciation may be either on a time or mileage basis, depending on high or low mileage, number of stops, etc.

Trucks furnished in long term service are selected by the Mileage company and are chosen to meet the particular requirements of the patron. Trucks are painted and lettered according to the patron's wishes and to all appearances they are his own trucks. In fact, the trucks are driven by his men, although drivers are furnished if necessary.

The contract requires that all trucks must be returned every night for in-



E. S. Higgins, vice-president

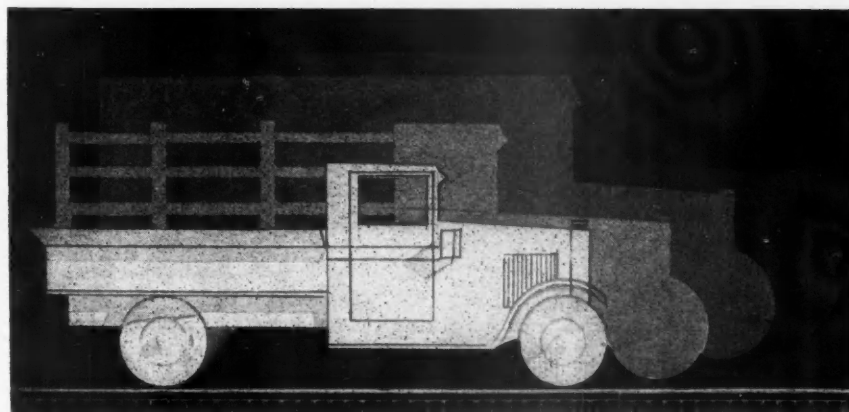
spection and minor repairs. This requirement is firmly insisted upon because the company's system of maintenance control and supervision is founded on nightly inspections. The trucks are also gassed, oiled and cleaned during the night. Patrons have the choice of three garages maintained for their convenience. They are strategically located, one being situated near the Delaware River, another in the business center of the city and the third in West Philadelphia.

The user contracts only for the number of trucks needed to meet average conditions. He is carried over peak periods by an emergency truck service offered by the company at regular drive-it-yourself rates. No matter what the condition, there is no uncertainty about costs as far as the user is concerned. He pays for delivery as he uses it.

The entire business of Motor Mileage is conducted along mass production lines. Low rates, which at the same time carry a profit for the company, are made possible by distributing the cost of engineering and management over a large fleet, fitting each truck to the job for which it is best adapted, standardizing maintenance methods and by buying parts, accessories, gasoline, oil, etc., in quantity lots.

To aid the user in solving any delivery problem with which he might be confronted, the Mileage company also provides an advisory service. Investigations and reports on better delivery methods and improved routing

(Turn to page 24, please)



OIL IS CHEAPER

Failure to Lubricate Chassis Bearings Through Omission or Neglect Increases Maintenance Costs

By James W. Cottrell

THERE is no argument anywhere about the desirability of adequate lubrication of chassis, or other bearings. No adage is more generally accepted in service stations than that "oil is cheaper than bearings." No fleet superintendent who is on his job ever *purposely* allowed a truck to go to destruction due to lack of lubrication. But the experience of fleet operators, and others, indicates that there is a chance for omission of lubrication, even in well managed fleets, unless special pains are taken to prevent it. In some instances omission becomes neglect and, as a result, chassis parts wear rapidly and finally break or become inoperative.

Several fleet operators who recently made a study of lubrication of truck chassis bearings were a bit surprised to find that there were loopholes in their established lubrication methods and schedules. Their studies also revealed that a further reduction in maintenance cost and a better feeling of drivers toward the maintenance department might be expected to follow an improvement in lubrication of the many bearings on a truck chassis which are outside the major units of engine, transmission and rear axles.

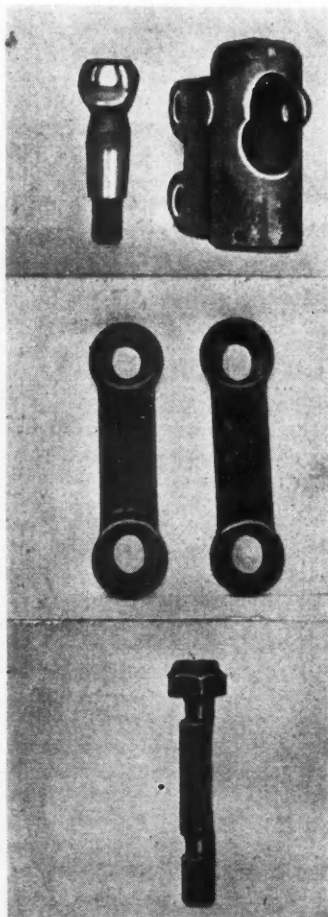
These fleets were not neglected, on the contrary, they were subjected to periodic inspection and were lubricated on schedules which were carefully thought-out and rigidly maintained. Yet one fleet superintendent found that steering connections were not lubricated often enough to insure easy

steering at all times. As the trucks in his charge were driven by driver-salesmen not under his control he added much to the good-will of his department by making sure that all steering connections were lubricated frequently.

Another fleet operator who had a rigid lubrication schedule found, upon looking up the cause of breakage of springs on trailers, that these units were being neglected because they were not brought in for fueling and therefore did not receive mechanical inspection except at long intervals.

Although conducted for a different purpose another study gave results in accord with those mentioned. Spring service stations reported that the percentage of replacements of spring plates because of frozen shackle bolts had decreased but that the total number of such replacements were not small.

Brake service specialists, especially those operating on flat rate charges, have a particular interest in lubrication of brake cross-



Top: Neglect of lubrication of these steering parts made the truck unsafe to drive

Center: Egg-shaped holes in spring shackles testify to lack of oil or grease

Bottom: A well-lubricated bolt does not wear like this



THAN BEARINGS



shafts and cam shafts. They, too, reported that there still are many frozen parts although the percentage is lower than was the case a few years ago.

The penalty of continued neglect of lubrication of chassis bearings is high maintenance cost and, perhaps, accidents. A loose connecting rod bearing goes to pieces very quickly from the hammering action and somewhat the same effect is produced when chassis bearings become worn. Hard steering, which is a symptom of lack of lubricant,

is the least of the evils following neglect of lubrication of the front end. The steering ball shown in one of the accompanying illustrations has worn the steering rod end until there is danger of the rod coming off.

Those who can least afford high maintenance cost are sometimes those guilty of neglect which brings the condition about. Certainly a person whose livelihood depends upon the operation of a few trucks is in no position to take chances on lubrication. He must see to it

that his trucks are not neglected in any way.

Many dealers, having in mind the possibility that lack of lubrication may cause complaint within the guarantee period, offer free inspection and even lubrication during this time.

The cost of replacing a main plate of a spring will pay for a lot of lubrication, and a king pin which freezes in its bushings and wears the axle yoke ends causes an expense which will buy plenty of oil and grease.

SPECIAL BODIES FOR

WENTWORTH & IRWIN, Inc., Portland, Ore., has brought out a bus body (Fig. 1) specially designed for school children. The body has a seating capacity of from 35 to 42 pupils and is mounted on a Model T-30, 1½-ton G. M. C. chassis. Safety was a primary consideration in the design of the equipment. As examples of some of the provisions: There is no step for children to ride on when the front entrance door is closed; the step is so designed that a child in case he fell out of the door would be thrown clear of the rear wheels; window levers are slow acting and short to make operation difficult; front door can only be opened by the driver, etc.

White oak is used throughout, all joints are mortised and screwed in position and forged brackets are used where necessary. Veneer panel is used as interior finish. Outside panels are of sheet steel and the roof is finished with heavy oiled duck. There are three rows of seats, two rows of side seats and one row of cross seats, the latter being of steel construction and firmly bolted to the floor. The cushions used on these seats are of the coiled spring type with curled hair and tan or blue fabricoid.

Interior dimensions: Length, 16 ft.; width, 80 in.; height, 60 in.; width of side seats, 17 in.; width of aisles, 11 in.; and width of center cross-seats, 24 in.

Nickel plated hardware is used throughout the interior. Window lifts are of screw type and of small design. The emergency door in the rear can be operated only by a latch enclosed in a glass box. As the glass must be broken to operate door, this provision prevents pupils from tampering with the emergency equipment.

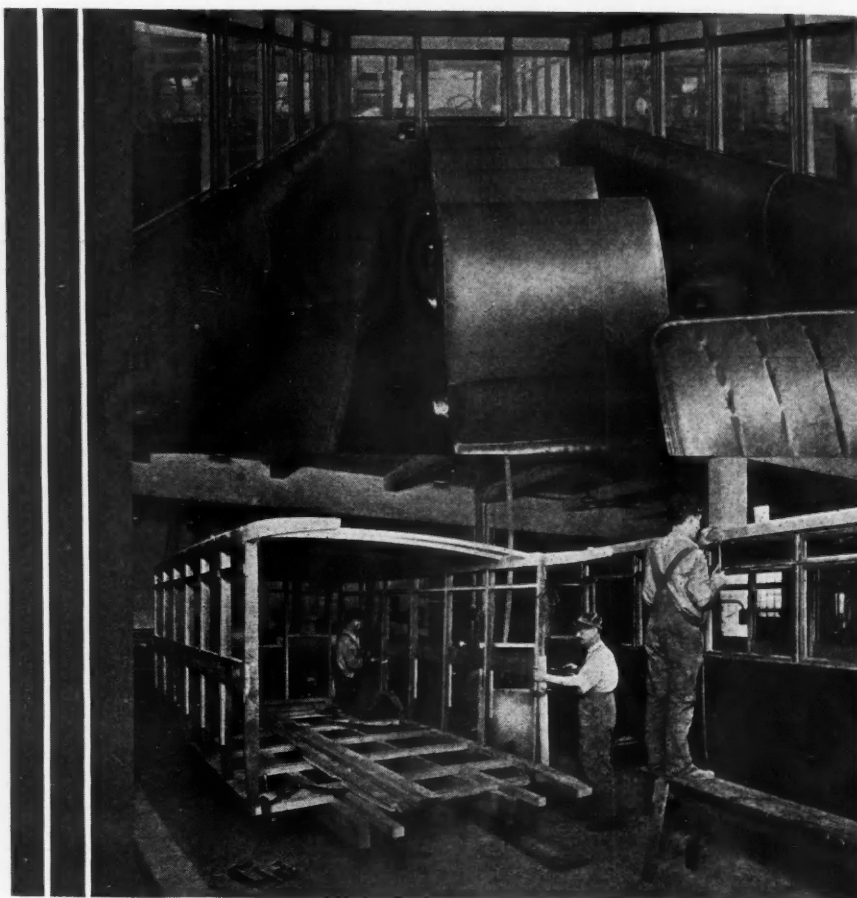


Fig. 1: Interior of Wentworth & Irwin 35 to 42-passenger school bus. All joints of the white oak frame are mortised and screwed in position

WH. KRAUSS CO., Philadelphia, Pa., produces armored bodies for banks, detective bureaus, large corporations, government, etc. (Fig. 2).

These bodies while custom built are of same general type of construction, variations being made because of difference in capacity, size and frame con-

struction of chassis and requirements of the user. For example, jobs are designed with or without doors in the rear, and with one or two doors on the right side at the front depending on whether or not a partition is constructed between the driver's compartment and the body. Size and location of windows and portholes, dome lights and construction of portable seat boxes for the interior are standard.

The bodies, which are of the swell side type, are built as light as possible, consistent with protection. The structure comprises oak frame, oak floor covered with 18 gage steel, three-ply wood panels and thin tongue and grooved roof supported by light bows. Protection is furnished by 16-gage, bullet-proof steel sheets riveted to sides, front, rear, roof and inside of cowl and ⅝-in., three-layer, bullet-proof "Safety Glass." The swell side type of construction is employed. Both the steel and glass have been tested against 45 calibre, Army Colt, steel-jacket bullets.



Fig. 2: Krauss armored bodies are shielded with 16-gage bullet-proof steel and ⅝-in. bullet-proof safety glass. Note port hole under rear window and six-inch drop of door sash

SPECIAL NEEDS

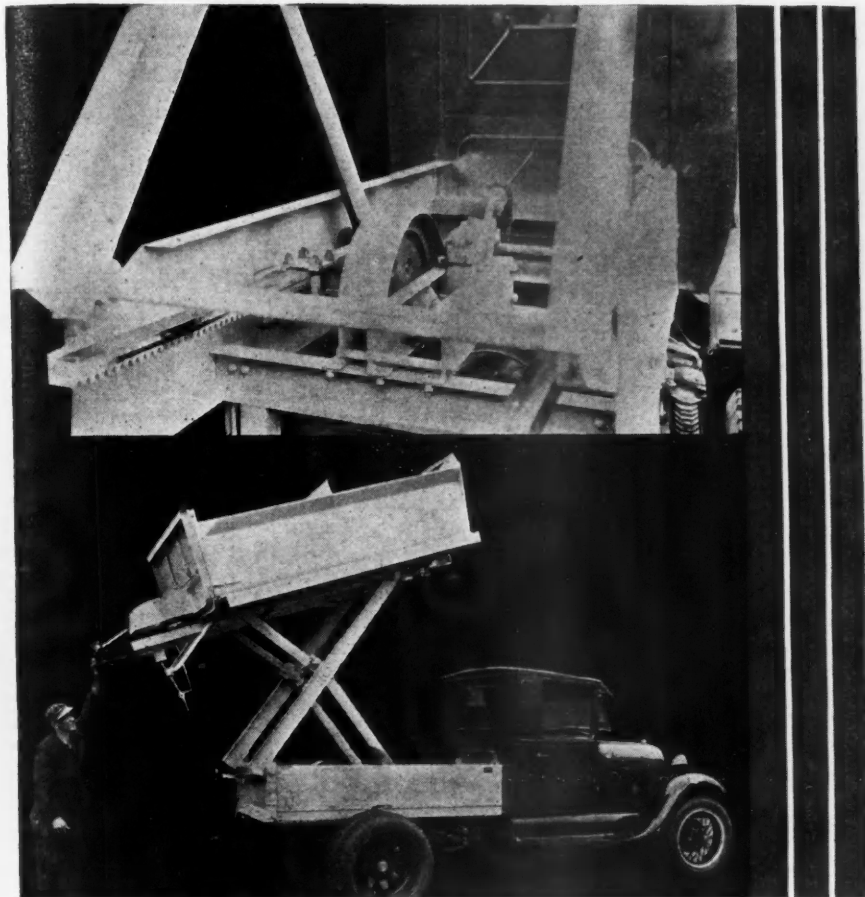


Fig. 3: FitzGibbon & Crisp high lift coal body for mounting on light duty chassis. Power for lifting is transmitted from power take-off through a chain, a universal-joint equipped shaft and irreversible worm gearing. A pinion on the worm gear shaft meshes with a large gear that drives two steel racks by two pinions mounted on the same shaft

side windows are 6 x 8 in. and carry quick action throw-up sashes. Grill work which is of brass is for decorative effect only. The 8 x 12 in. window carries a fixed sash, but immediately under it is a porthole. Hand operated cowl-type ventilators are built in the roof, one over the driver and one in the center of the body roof.

Understructure depends on specifications and may consist of oak or iron channel cross members bolted direct on frame side members or side sills.

The cab doors carry sashes that drop only six in. to protect the heads of the occupants and at the same time provide ventilation. The doors are hung on four hinges and equipped with inside locking Yale locks. The windshield is stationary and mounted in a steel frame. Two 2½ x 6 in. portholes equipped with sliding doors are provided under the windshield, one on each side. Foot-operated ventilators are built in each side of the cowl at a point midway between the top and bottom of the hood.

There are two windows in each side and one in the rear of the body. The

*The Commercial Car Journal
and Operation & Maintenance*

A NEW high-lift coal body (Fig. 3) for mounting on Fords, Chevrolets and other light duty trucks, and which lifts to 7 ft., for dumping, has been placed on the market by FitzGibbon & Crisp, Inc., Trenton, N. J. This new unit was designed for use in suburban districts or sections where paving or road conditions will not permit the use of heavy units. It is offered in 1, 1½ and 2-ton capacities.

Power for the operation of the body is taken from the transmission through a power takeoff (see illustration).

Lifting mechanism, including the drive, rack and lifting arms, as well as the coal chute are carried in the under-structure. The side members of the under-structure are mounted directly on the chassis frame and are about the height of an express body.

IN addition to its general truck business the Columbus & Cincinnati Trucking Co., Columbus, Ohio, is under contract with the Cincinnati Cinema Exchange to transport films from theatre to theatre throughout the area. A special body (Fig. 4) mounted on a 1½-ton Garford was designed and built by a local body builder, the Blackston Garage, to facilitate film handling.

The body is much like a van in appearance, 4½-ft. high and 3 ft. from the ground. Sides and roof are of wood, reinforced on the inside by substantial latticed side-boards to protect both the outside panels and the containers themselves in case they are jostled. The floor is strapped so that containers can easily be slid in and out.

Containers are loaded from front to rear to expedite deliveries on the road. They are arranged in rows, three high, constituting a good load of approximately 150 boxes.

Fig. 4: This body was specially designed for transportation of movie films. Films are packed in metal hasp-locked containers, one foot cube and weighing about 50 lb.



April, 1929

TRUCK-TERMINAL

The fourth of the important series of articles on Cooperative Truck Terminals

ARRANGEMENTS between the operators of motor truck lines and cooperative truck terminals through which they operate as focus points vary, depending upon the size and importance of the terminal companies or associations and the operators using the terminals. In some cases associations of truck operators lease the terminals jointly and divide the expenses of the operation of the facilities. In other cases the terminal companies operate several or a number of truck lines and rent facilities to independent operators engaging in services over other routes. A third type of arrangement is made between separately owned truck terminals and truck lines on a basis of contractual agreements entered into by the officers of the terminal companies and the proprietors of the truck lines.

A typical arrangement between a truck terminal company and line haul operators provides that the terminal company agrees to establish and maintain terminal facilities at one or more points and to place these facilities at the disposal of the line operators at reasonable charges as receiving, storage and delivery depots, subject to stipulated conditions.

The terminal company management agrees to afford each contracting motor truck operator using the terminal the facilities of the depot for receiving, storing and handling inbound and outbound freight upon the same basis as all other carriers using the facilities upon similar contractual bases. The terminal managers bind themselves to provide a sufficient force of station employees to handle the business of all of the carriers without discrimination or preference. These services include both the physical handling and storage



of the goods as well as the records and billing.

The line operators agree to pay into the treasury of the terminal company a sum of money fixed by the terms of the contract as a membership fee or deposit fund to guarantee the prompt payment of charges of the terminal company for services rendered by it to the line operators. Charges assessed against the operators for services are drawn from this hostage fund when they are due. At the end of each week's business the charges for handling the goods of the line operators and for other services incident to the operation of the terminal are computed and the share of each operator is deducted from his deposit fund. By the middle of the succeeding week the operators against whom the charges are levied are required to pay the manager of the terminal company the amounts equal to those deducted from the membership

fund so as to keep the original fund of each contracting operator equal to the amount originally placed upon deposit.

If any line operator fails to keep the deposit up to the required amount or to pay the charges assessed against the fund promptly when due, the operator may be dropped from the list of carriers entitled to the privilege of the use of the terminal facilities and of having services rendered by the employees of the terminal company. All privileges and services of which the operators may be deprived if the charges against their deposits are not paid may be restored if, at the option of the manager of the terminal company, the delinquent operators are permitted to bring their balances up to the required minimum deposit after paying the bills or obligations against them.

The truck terminal company may draw upon any balances of the delinquent line operators to discharge their

RELATIONSHIPS



Arrangements Between Line Operators and Terminal Company Aimed to Effect Mutually Efficient Operation

By G. Lloyd Wilson

Professor of Commerce and Transportation, University of Pennsylvania

fee, are defined in the contract. Provision is made for the extension of these limits upon occasion to make pickups or deliveries if, in the opinion of the manager of the terminal company, the circumstances and conditions warrant such action, and with the understanding that the extension of the zone in particular instances does not establish a precedent giving the line operators the right to demand of the terminal company the continuance of such services beyond the stipulated boundary upon other occasions.

The terminal company, in return for the payment of the platform fee or charge by the line operators, assembles all freight brought to the terminal for the respective line-haul operators. Freight bills are executed in triplicate for each shipment by the clerical force of the ter-

obligations or retain the balances as liquidated damages for the breach of contract.

The terminal company charges the line haul operators a fee for each one hundred pounds of the freight hauled by the line operators which is handled over the platform of the terminal company by the latter's employees, when the terminal company does not perform either a pick-up or delivery service to or from the terminal.

An additional charge is assessed against the operator which is to haul or which has hauled the goods in line service for each 100 lb. of freight in connection with which the terminal company performs either a pickup or delivery service, at the request of the line operator.

The boundaries of the zone in which the pickup or delivery services are rendered by the vehicles and employees of the terminal company for the stated



View of platform, Union Terminal, Indianapolis, Ind.

minal company. These bills indicate the weight of each shipment, the freight rate and the total amount of freight charges prepaid or to be collected.

One copy of the freight bill accompanying each shipment is signed by the truck driver of the line carrier, and it is retained by the terminal company as evidence and a receipt that the goods have been delivered to the line carrier. Two copies of the bill are given by the terminal company to the driver of the truck, one of which is given by him to the consignee upon the delivery of the goods, while the other copy is signed by the consignee as a receipt for the goods.

The line operators are required to agree to have all checks in payment of C.O.D. shipments or advance or prepaid freight charges made payable to the shippers and to deliver the checks in settlement of transactions of these sorts to the terminal company the day following their receipt by the line operators. If the settlements are made in cash the line haul operators are required to give their personal checks to the terminal company. The truck terminal company transmits the settlements to the shippers entitled to receive them. If the line operators fail to settle the C.O.D. payments or advance freight charges in the manner outlined, the truck terminal company is authorized by the operators to draw upon the operator's deposits for amounts to cover. These withdrawals must be made up by the operators so as to keep the fund intact.

The line operators pledge themselves to keep copies of the receipts from the insurance companies carrying the risks showing that the full premiums on their public liability, property damage and cargo insurance policies have been paid, and the periods for which the policies are in force. The terminal company requires as a standard condi-

tion that each line operator carry the amount of insurance in a reliable insurance company as is determined by the terminal company in excess of the minimum amount required of each motor freight carrier by the state public service commission. In case of loss or damage of cargo the line operator is required to report the matter to the manager of the terminal company within 24 hours after it occurs.

If any operator using the terminal fails to keep the required insurance in full force and effect and to keep the premium receipts on file with the terminal company, the manager of the terminal may at his discretion deprive the line operator of the privileges and services of the terminal and the operator's deposit fund may be drawn upon by the terminal manager to defray any expenses incurred. If the line operator renews the insurance, the terminal company may either restore the operator to operating privileges and services or refuse to reinstate the operator, at the discretion of the manager of the terminal.

At the end of each month's business the terminal company is given the privilege of analyzing the gross incomes of the line operators and to bill them for a fraction of one per cent of their gross incomes. The operators agree to pay this assessment promptly to the terminal company. The money received from all of the carriers using the terminal is pooled and administered as a contingency fund, out of which are paid small losses which either are not covered by the insurance policies or for which claims are not filed against the insurers because of the small amounts involved. The fund is also used to pay claims against the carriers for the theft, the loss or misdelivery of packages, the miscounting of shipments, or any other claims for which insurance

coverage cannot be or is not obtained by the line carriers.

The line operators agree to require their employees to observe the regulations, methods and practices established by the terminal company in all of their transactions with the terminal company, in order to promote standard and efficient practices and to place responsibility properly.

If the terminal company secures orders for the transportation of traffic from or to any point along the lines of any operator using the terminal, which the operator cannot or does not wish to transport for any reason, the terminal company reserves the right to handle the goods in vehicles provided by it at the expense and for the benefit of the terminal company.

The line operators agree, also, that if a vehicle of any operator is incapacitated so that it cannot transport or deliver its cargo or part of its cargo, and the line operator is unable or unwilling to provide substitute equipment to complete the transportation and delivery of the goods, the terminal company has the right to furnish the equipment necessary to maintain service on the route. If the volume of traffic on this route is not sufficient to defray the costs of operating the services, the line-haul operator failing to provide the equipment to perform the services, agrees to pay the terminal company, or other party supplying the substitute services, an amount sufficient to meet the operating expenses and a reasonable profit.

(The next article in this series dealing with the operation and management of cooperative truck terminals will deal with the billing arrangements and practices of handling consignments of goods through the terminals and over the routes of the carriers).

Separate Staffs

(Continued from page 16)

qualifications demanded of truck salesmen and the need for specialization.

C. C. Morgan, manager of the Mack International Motor Truck Corp. branch at Milwaukee, expressed the belief that "where a combination dealer has 25 or more possibilities for the sale of trucks, he should have two separate staffs for the distinct lines." Trucks, he said, are a specialized line and the truck salesmen must know how to analyze the needs of prospects and how to advise.

"There should be two forces of salesmen in every shop that sells both trucks and passenger cars," declared H. L. Smoots, sales manager for the Federal Truck Co. branch of Birmingham, Ala. "It takes a different type of salesman, a different training and a different point of view to handle the vastly different clienteles that the man selling trucks and the man selling passenger cars must handle. A man can-

not, as a rule, be trained to handle both jobs at the same time."

"Absolutely yes; a dealer should maintain separate staffs of salesmen," was the opinion of L. D. Hemmon, Phoenix, Ariz., General Motors Truck distributor. "More than that, he should separate them as far apart as possible physically, both as to salesrooms and service shops. The machines are different, the customers are different, the problems are different, and the methods are different. You want your salesman to concentrate and you want your prospect to concentrate, and anything that divides the attention of either produces lost motion, scatters your shot and sends you on a detour.

"To sell a man a passenger car, you've got to sell his wife; to sell a man a truck, you've got to sell his partner and his drivers. If you must carry on a mixed business, your salesman is the man to overcome all the obstacles and keep your business straight. By all means, make your salesman a specialist."

Selling Mileage

(Continued from page 17)

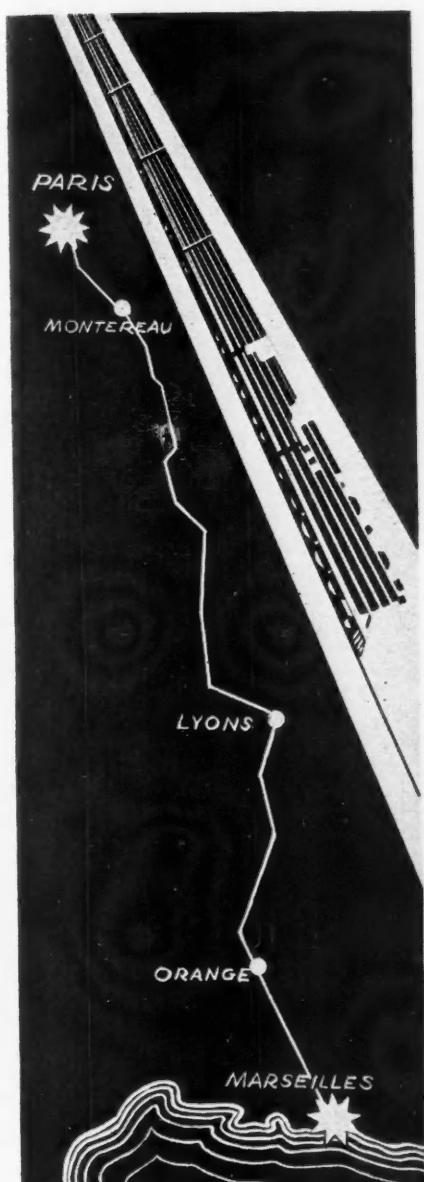
are available to customers without charge. The company officials, experienced in the employment, instruction, and handling of drivers, also place this experience at the disposal of patrons requesting assistance.

At the present time the Motor Mileage fleet, which is divided into three groups, comprises 200 units. The first group consists of those trucks on long term contracts; the second, reserve trucks for emergency and peak period service, and third, trucks used in hourly service.

The enterprise is being managed by men of experience in the financing and motor transportation fields, among whom are John H. Packard, 3rd, president; Frank K. Dutcher, vice-president, also general manager Finance Corp. of America; E. S. Higgins, vice-president, formerly vice-president Yellow Cab Co., Philadelphia, and Verne C. Kennedy, general manager.

BEATS RAILROADS ON 525-MILE HAUL

*High-Speed Truck Line With 24-hr.
Service Between Paris and Marseilles
Saves Three Days Over Fastest Freight
Train*



A DIRECT high-speed 24-hour motor truck service between Paris and Marseilles, a distance of 525 miles, is now in daily operation by vehicles built by the Bernard Co., of Paris, and having a six-cylinder engine produced under Lycoming license. This is the longest and fastest truck service in Europe, and is being run in competition with the most efficient railroad company in France, at railroad rates. The saving in time is three days over the fastest freight trains.

Leaving Paris each evening, with a pay-load of 3 tons, and a total weight with tanks filled, two drivers and their necessary equipment of almost 7 tons, the trucks reach Marseilles within 24 hours, and the whole of the freight is distributed locally within 25 hours from collection in Paris. Although no freight

is delivered at intermediate points, three stops are made, for gasoline and food, at Montereau, Lyons and Orange. Allowing for these stops and time out at closed grade crossings, traffic obstructions, etc., the net running time is reduced to 18 hours, which means an average speed of nearly 30 m.p.h. The fastest express trains make this journey in 13 hours, but many of the passenger trains occupy 18 hours for this run.

The two drivers take turns at the wheel, and drive throughout the night without a stop. They are obliged to maintain timetable schedules and are not allowed to gain time except on the last stage of 80 miles between Orange and Marseilles. Six round trips are made without a break, after which the men rest for four days, during which time the trucks go into the shops for inspection. The crews remain continuously on the same truck.

At the present time five trucks are in service, with a sixth one in reserve, and there is a daily service each day in

both directions. Since it was inaugurated six months ago the trucks have never missed a journey or been behind time.

By making this journey within 24 hours, instead of three to four days by train, connections with African and Oriental steamships can be made, which sometimes effect a saving of 10 to 15 days. The freight is of a varied nature, ranging from castings to hats and millinery, and the vehicles always leave Paris with a full load. For the return journey the traffic is more variable, because Marseilles is a less important manufacturing center than Paris.

In view of the severity of the service and guarantees against mechanical breakdown, the makers keep a close watch on the vehicles. The engines are not governed, but the drivers are selected with care.

Each man is required to turn in a detailed report at the end of every run and this is checked against the Controlograph record. Lubricating oil is changed every round trip, or at intervals

(Turn to page 46, please)



The Bernard Six Special leaves Paris each evening with a pay-load of 3 tons for Marseilles, stopping only at three intermediate points for gasoline and food

FARGO STARTS LARGER

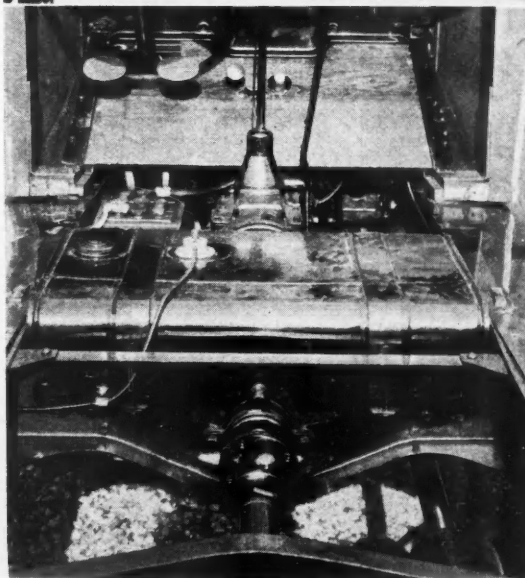
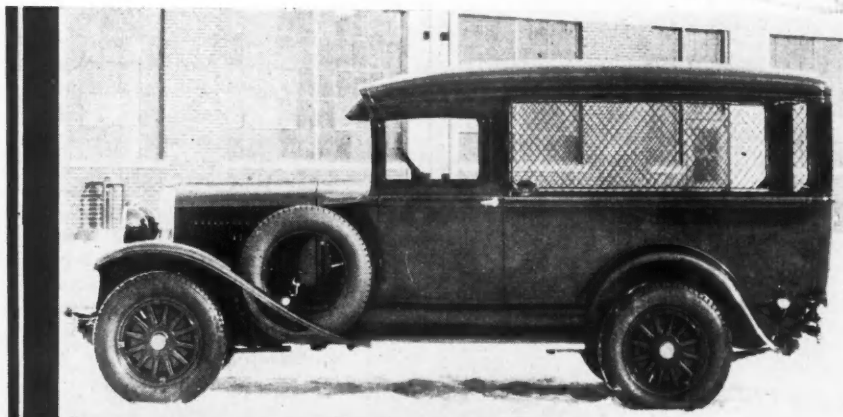
Equipped With 6-Cylinder Engine, 4-Speed Transmission, and 4-Wheel Hydraulic Brakes. "Packet" ½-Ton Delivery Now Powered by a Six

ANNOUNCEMENT has been made by the Fargo Motor Corp., Division of Chrysler Motors, that the new Fargo 1-ton six-cylinder truck, the first of a line of larger trucks, is in production for deliveries to begin the latter part of this month and that the Fargo Packet ½-ton delivery truck is to be powered by a six-cylinder engine.

Among the features of the new truck, which with a list of \$795 is competitive in the lowest price class for one-ton trucks, are four-wheel internal hydraulic brakes, four-speed transmission with provision for power take-off, heavy-duty rear axle, large tires, gracefully rounded special bodies and pyroxilin finish in four color options.

To achieve low price without skimping and simplify the obtaining of parts through interchangeability the corporation has taken advantage of its large scale Chrysler passenger car production by using here and there interchangeable parts adapted to truck use. This is particularly true of the engine, which while modified to adapt it to truck use, carries most of the major parts of the DeSoto six powerplant. Major dimensions of the engine are given in the accompanying table. The engine is equipped with air-cleaner, Purolator, gasoline filter, crankcase ventilation, thermostat and manifold heat control.

Lubrication of the throwout bearing



Close-up of center cross-member and gas tank of the new one-ton Fargo truck. The tank which straddles the propeller shaft has a double outlet to equalize the fuel level in the two sides. Two outlets are joined at the right in a T-connection, a single pipe running from there to the vacuum tank

The Fargo Packet ½-ton delivery truck is now equipped with a six. With the substitution, all Fargo trucks will be of the 6-cylinder type

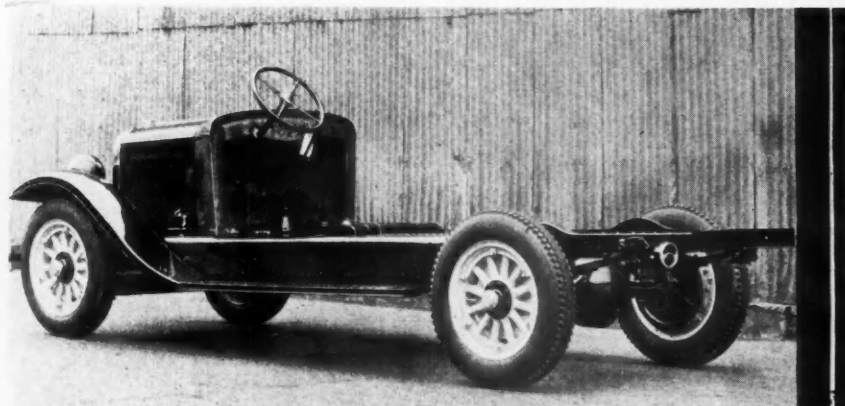
for the 10-in. single plate multiple spring clutch is by a grease cup on a tube running forward into the engine compartment. The four-speed transmission is a new unit using standard S. A. E. shift, with a latch out for reverse backward and to the right of high, or direct. Bearings in this transmission, with the exception of the reverse idler and pinion, are all of the anti-friction type.

The rear axle is housed in a steel cast-

SERIES WITH 1-TONNER

type and de luxe cabs. They are of composite construction, with wood, posts, ironed top and bottom. There are no wheel houses. Metal side panels extend the full length of the body interior, up to 12 in. above the floor, being attached to floor and body uprights.

The engine of the Fargo Packet ½-ton delivery truck also has been developed from the DeSoto Six engine and contains such features as crankcase



Side view of the new Fargo one-tonner. Note the low gas tank mounting, flush with the body floor boards, small kick-up over rear axle and oversize rear tires



Front view of the one-ton Fargo showing radiator shell, double filament headlight bulbs, headlight support and bumper

ing. The pinion is straddle mounted on ball bearings, while the wheels are mounted on double Timken bearings. Axle shafts are 1 31/32 in. in diameter.

To obtain low height, the frame is kicked up over the rear axle. The front engine mounting has spring loaded hold-down bolts below the front frame cross-member.

Bodies supplied by Fargo include a panel delivery, canopy express, screen delivery and sedan delivery. These bodies are all furnished with a special rounded cowl of the passenger car

ventilation, invar strut pistons, with tongue and groove rings, oil-filter, air cleaner, etc. This new engine develops 55 hp. at 3000 r.p.m. Prices of the new Packet have been revised slightly upward: Chassis, \$595; Canopy model, \$835; Panel and screen deliveries, \$845; and sedan, \$945.

Specifications of One-Ton Fargo

Capacity	.....1-ton
Wheelbase	.....133 in.
Engine	
Type	.....L-head
Size	.....6-3/4 x 4 in.
Displacement	.....174.9 cu. in.
Hp. @ 3000 r.p.m.	.....55
Compression ratio	.....5 to 1
Pistons	.....Aluminum-Invar strut
Conn. rods, length	.....8 15/16 in.
Crankshaft diameter	.....2 1/4 in.
Number of bearings	.....4
Valve head diameter	.....1 15/16 in.
Carburetor, make	.....Stromberg
Feed	.....vacuum
Gasoline tank, capacity	.....15 gal.
Ignition, make	.....Delco-Remy
Generator and starter	.....Delco-Remy
Radiator, type	.....cellular
Capacity	.....2 1/2 gal.
Temperature control	.....thermostat
Clutch, type	.....single plate
Size	.....10 in.
Transmission, speeds	.....4
Mounted	.....unit
Propeller shaft	.....2-piece
Universals, make	.....Universal products
Number	.....3
Rear axle, make	.....Clark
Type	.....semi-floating
Ratio	.....5.67 to 1
Tread	.....59 in.
Drive and torque	.....springs
Steering gear, make	.....Hannum
Type	.....worm and nut
Service brake, make	.....Lockheed hydraulic
four-wheel	
Drum, size, front	.....14 x 1 1/4 in.
Diameter, width, rear	.....15 x 2 in.
Parking brake, location	.....transmission
Springs, front	.....39 x 2 in.
Rear	.....51 x 2 1/2 in.
Chassis lubrication	.....Alemite
Wheels, type	.....wood
Rims, size	.....20-in. truck
Tires, front*	.....5.50/20 in.
Rear	.....32 x 6 in.
Frame, depth, thickness	.....6 x 5/32 in.
Body dimensions	
Length back of cab	.....96 in.
Length back of dash	.....148 in.
Width at floor	.....45 1/4 in.
Width at belt	.....49 in.
Inside height	.....50 in.
Back of cab to center of rear axle	.....49 in.

* 32 x 6 in. interchangeable on same rim; spare, 32 x 6 in.

FLAT RATE PRICE LIST

NUMBER 28

FORD MODEL A

Rear Axle

1. Remove and replace rear axle assembly. No repairs included.
Delivery chassis \$ 4.00
Truck 5.00
3. Remove rear axle assembly, overhaul and reinstall
Delivery chassis 9.00
Truck 13.50
4. Remove and reinstall or renew one axle shaft
Delivery chassis 7.00
Truck 7.50
5. Replace differential housing
Delivery chassis 6.50
Truck 7.50
6. Replace axle housing, one
Delivery chassis 5.00
(a) Replace axle housing, both
Delivery chassis 6.00
11. Renew axle housing, oil retainer one side
Delivery chassis 5.00
Truck 5.50
(a) Both sides
Delivery chassis 6.00
Truck 7.00
12. Renew outer roller bearing, one side
Truck 0.75
13. Replace torque tube
Delivery chassis 7.00
Truck 6.00
14. Replace rear radius rod
Delivery chassis 1.50
Truck 2.00
15. Tighten rear radius rod
All models 0.50
16. Replace universal joint
Delivery chassis 4.00
Truck, 1 joint 4.00
Truck, both joints 5.00
17. Install new universal joint housing gasket
Delivery chassis 1.50
18. Free up brake cam
Truck, one 2.00
Both 3.25
19. Replace worm thrust bearing
Truck 1.50
20. Replace front universal joint housing
Truck 2.25
21. Remove and replace jackshaft or housing
Truck 6.00
22. Replace torque tube retainer
Truck 5.50
23. Remove and replace or install dual high transmission
Truck 6.50
24. Remove, overhaul and reinstall dual high transmission
Truck 9.00

Front Axle

2. Remove and reinstall axle center, 4-wheel brake type
Delivery chassis and truck... \$4.25
3. Straighten axle after axle has been removed
Delivery chassis and truck... 2.50
5. Remove and reinstall or renew both right and left knuckle assemblies, 4-wheel brake type.
Delivery chassis and truck... 4.25

NOTE

Prices for Ford Model A delivery chassis and truck are based upon figures in the Schedule of Repair Charges, prepared by the Ford Motor Co., for use by its dealers.

Operations in this list follow, in general, the Rapid Flat Rate and Data book although changes have been made in several instances. In addition to these operations several are listed which are not in the book. These cover parts, such as the enclosed forward propeller shaft, which are not used in passenger car design.

7. Overhaul front axle, including rebushing spring perches if necessary and aligning and adjusting of front wheels
Delivery chassis and truck... \$6.00
8. Replace spindle connecting rod
Delivery chassis and truck... 0.75
9. Replace drag length
Delivery chassis and truck... 0.75
10. Replace front radius rod
Delivery chassis and truck... 2.00
11. Tighten front radius rod
Delivery chassis and truck... 0.50
12. Straighten front radius rod and line-up front assembly
Delivery chassis and truck... 2.25
13. Tighten all sockets and joints of front end
Delivery chassis and truck... 1.00

Steering

13. Replace gear and/or worm
Delivery chassis and truck... \$3.75
14. Adjust end play in gear
Delivery chassis and truck... 0.50
15. Adjust end play in worm
Delivery chassis and truck... 0.50
16. Overhaul steering gear assembly, does not include front axle
Delivery chassis and truck... 5.00
17. Renew steering shaft lower bearing
Delivery chassis and truck... 1.50
18. Remove and reinstall steering wheel
Delivery chassis and truck... 1.00
19. Tighten steering gear housing to the frame
Delivery chassis and truck... 0.50

Brakes

3. Minor adjustment of service brakes
All A and AA models..... \$0.75
4. Service brakes adjust complete including rods and shoes. On cars with adjustable rods
All A and AA models..... 1.50
6. Adjust hand brake
All A and AA models..... 0.75

- 13x. Install exchange shoes, service brake only and adjust
All A and AA models..... \$3.50
23. Replace brake drum
All A and AA models..... 0.75
24. Replace brake rod
All A and AA models..... 0.75

Radiator

1. Remove and replace radiator assembly
All A and AA models..... \$2.25
2. Core and tank unit, renew
All A and AA models..... 6.00
3. Shell, renew
All A and AA models..... 1.00
4. Overhaul radiator
All A and AA models..... 7.50

Hose

5. Top hose, renew
All A and AA models..... \$0.40
6. Lower hose, renew
All A and AA models..... 0.40

Fan

8. Belt, renew
All A and AA models..... \$0.40

Water Pump and Fan Assembly

11. Remove and replace water pump and fan assembly
All A and AA models..... \$1.25
13. Packing, renew
All A and AA models..... 0.50

Manifolds

1. Inlet to cylinder gaskets, renew
All A and AA models..... \$0.50
2. Exhaust manifold to cylinder gaskets, renew
All A and AA models..... 0.75
3. Intake and exhaust manifold to cylinder gaskets, renew all
All A and AA models..... 1.00

Fuel System

6. Carburetor, remove and replace
All A and AA models..... \$0.75
7. Carburetor, remove, disassemble, clean, reassemble and reinstall
All A and AA models..... 1.50
9. Remove and reinstall gasoline tank
All A and AA models..... 9.00
10. Replace gas line
All A and AA models..... 0.50

Muffler

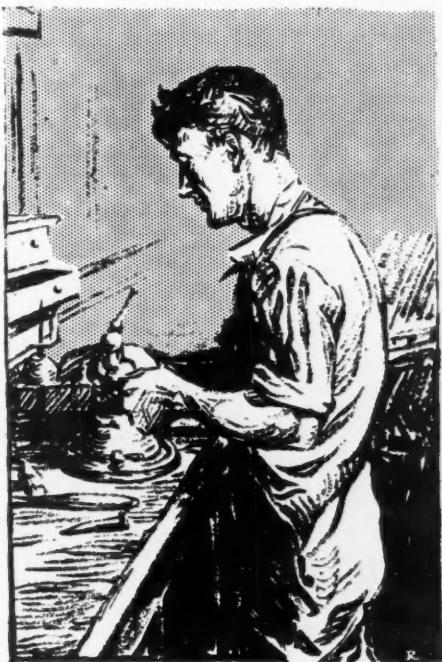
12. Muffler, remove and replace or renew
All A and AA models..... \$1.25

SERVICE HINTS

From Shop and Factory

\$5

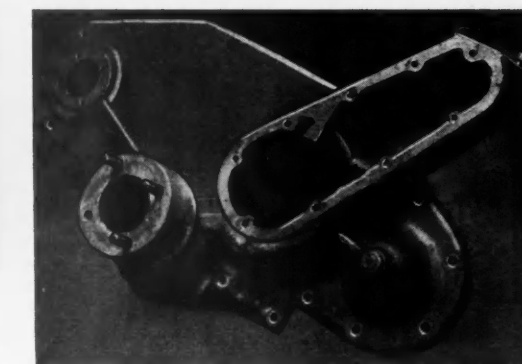
Ideas for Service Hints from shop men are welcome. Tell all about the idea in shop terms and send drawing or photograph. Five dollars will be paid each successful contributor.



Rust Under Oil

Rusting of parts inside an engine crankcase, which takes place at times, is a puzzle to many service men. As rusting of parts exposed to the weather can be prevented by coating such parts with oil, it is hard to figure out how parts can rust in a place like the inside of a crankcase where oil is present and an oil film covers all exposed surfaces.

Corrosion can take place under a film of oil according to the findings of the U. S. Bureau of Mines. An investigation of corrosion of rifles in storage revealed that damage took place in some cases, although the bores were covered with oil. High humidity and presence of products from burning powder were found in all such cases.



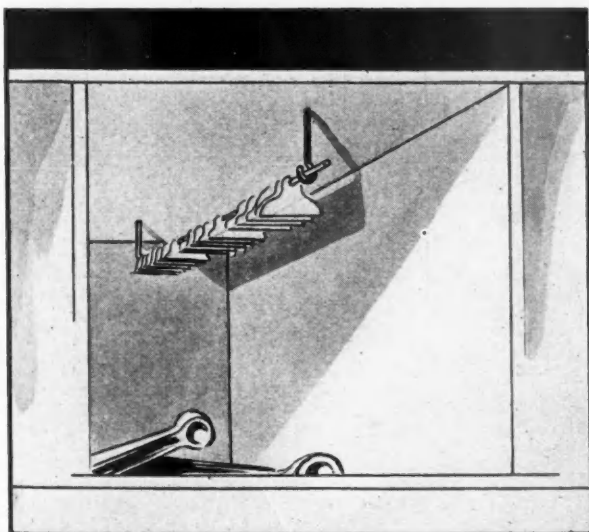
Above, Right: Bronze was built-up on bearing on front of timing gear cover case by welding. Left: Showing surface after machining to size

As water is formed during the combustion of gasoline in an engine there may be high humidity in the crankcase, especially if there is much blow-by. Vacuum Oil Co. engineers report that acid may be formed in the crankcase from sulphur in fuel and that "if the content of sulphur compounds is relatively large, then corrosion may be expected if moisture collects in the crankcase."

The obvious remedy for the situation is to keep crankcase dilution at a minimum.

Storing Shims

After trying a lot of different ways of keeping bearing shims in stock a shop man hit upon the idea of suspending them on stiff wires. The shims take up no room in the stock bins because they are placed on the top of a shelf in a stock bin, out of the way. The wires are shaped something like a large safety pin, as shown in the illustration.

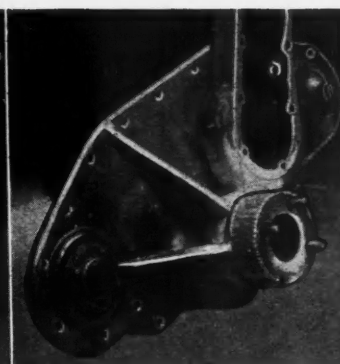


Shims stored on wires take up no room in stock bins

Building-up Bronze Bearing

A bronze bearing on the front of a truck engine timing gear case cover, which formed the front engine support, was built-up by adding bronze by the welding process.

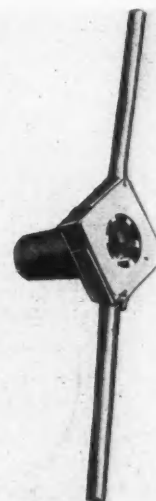
It was not necessary to preheat the housing before the welding was per-



formed, according to Linde Air Products Co. The welder built up a layer of bronze about $\frac{1}{4}$ in. thick. The bronze was afterward turned down to fit the cross member bracket.

Axle Thread Die

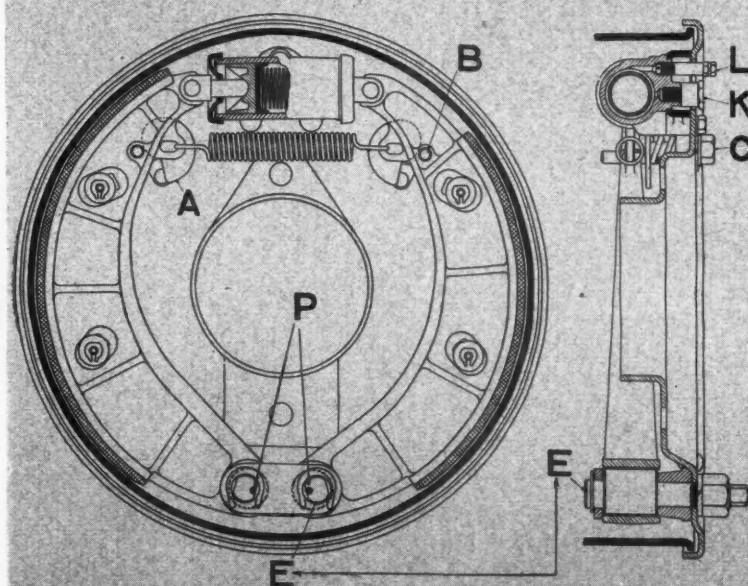
A long tube which aligns the cutting die with rear axle tubes when chasing threads on the tubes is incorporated in a die used in the shop of the Standard Oil Co. of N. J. in Newark, N. J. It is difficult to start a die of this size on threads unless there is a support in line with the part on which the threads are cut.



Large die for axle tube threads

SERVICING HYDRAULIC-

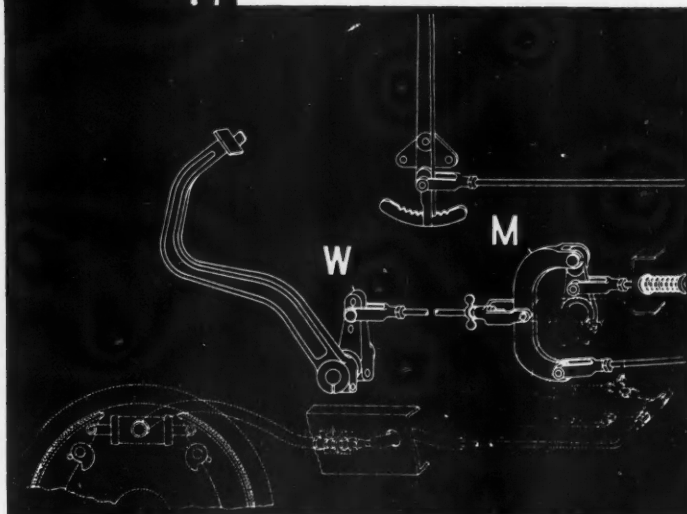
Internal Four-Wheel patch Models Have



Above: Hydraulic front brakes. Two nuts C on the backing plate control movement of cams at A which contact with pins B, moving the top of the brake shoes toward or away from the drum. To adjust the brakes jack the wheels off the ground and turn nut C until the shoe starts to drag just a little, then turn back just enough to allow wheel turn freely. Turning nut C toward the rim of the wheel with wrench handle pointing upwards brings shoe closer to drum. Recommended clearance is .015 at toe and .005 in. at heel of shoe. To adjust clearance at heel turn the inner end of each anchor pin to set clearance at .005 in. Center punch marks P on the wheel end of anchor pin at points E should be near each other for this clearance and flats on the pins will stand at angle of about 15 degrees from vertical as shown. Anchor pins are not adjusted except when installing new lining

AUTOCAR DISPATCH models SA and SD incorporate an unusual combination of hydraulic front brakes and mechanical rear brakes, both of the internal type. Braking effort is proportioned between front and rear brakes by an equalizer, a yoke which is attached to the upper end of the hydraulic master cylinder arm and to a single brake pull rod connected to the brake cross shaft. Right and left front brakes are equalized by the hydraulic system but there is no equalization right to left of the rear brakes. A return spring is attached to the vertical arm of the master cylinder by means of a clevis end rod. The spring bears against the rear of the frame cross-member and the rod extends through a hole in the member. The function of this assembly is to return the master cylinder arm to off position so that the cylinder may be filled automatically. No adjustment is required at this point. However, travel of the arm should be checked occasionally.

The supply tank should be inspected at monthly intervals in order to make certain that the level of the liquid does not fall below the half-way mark. If the supply of liquid is too low air will enter the system and it will be necessary to bleed the lines to restore proper braking action.



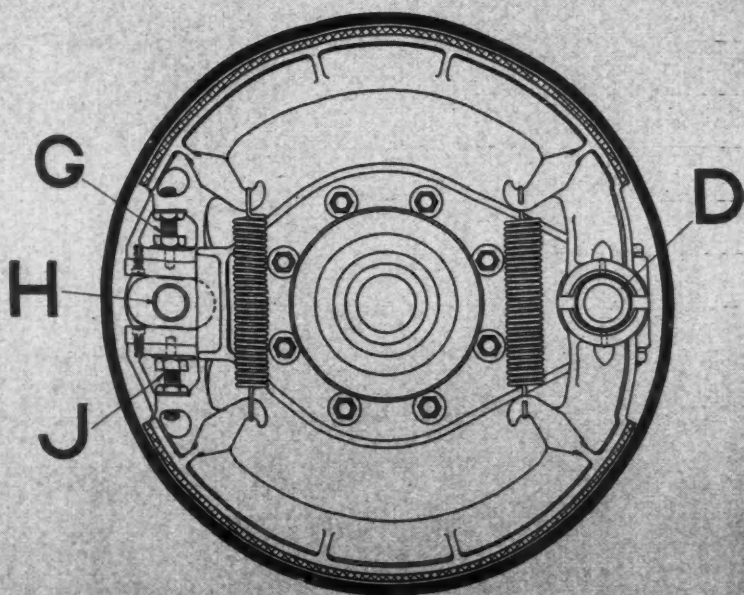
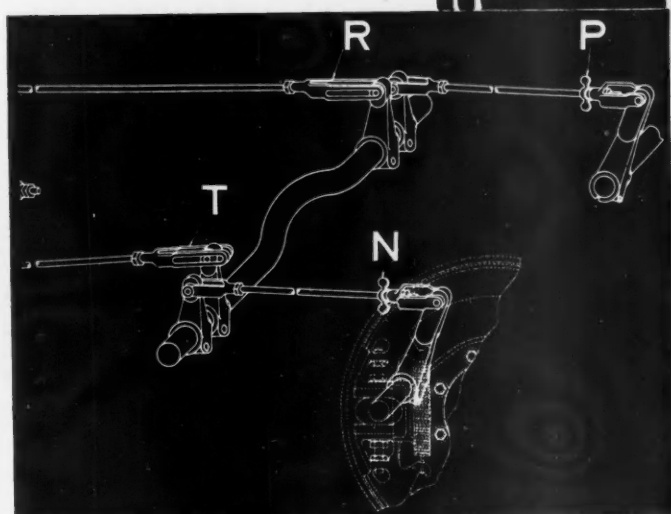
MECHANICAL BRAKES

Brakes on Autocar Dispatch Simple Adjustments

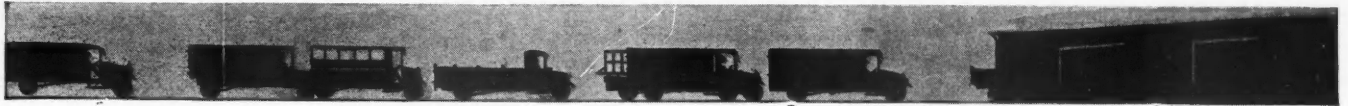
The brake lever operates on the rear wheels only, a pull rod turning the same brake cross shaft and actuating the same rear brake shoes. Slotted clevises on the pedal and lever pull rods permit either to move without disturbing the other.

Front brakes are 16½ by 2½ in. and the rear brakes 18 by 4 in.

Below: Hook-up of hydraulic front brakes and mechanical rear brakes on Autocar Dispatch models SA and SD. Minor adjustment of rear brakes is made by wing nuts N and P. Front brakes are adjusted at the wheels. Note slots in clevises T and R which permit either pedal or lever to operate rear brakes. Yoke M equalizes pedal effort to front and rear wheel brakes. There are three clevis pin holes in the pedal shaft lever W, the middle hole for ordinary use, the upper hole for vacuum booster and the lower hole for very soft pedal action



Above: Rear brakes. To make minor adjustment for wear turn the two wing nuts at N. and P. For major adjustments after relining or whenever brake shoes are replaced adjust brake shoes to drums by means of screws J and G. Jack up the wheels and turn the screws with the wheels turning until a very slight drag is felt. Lock adjustment in this position. Camshaft H and hinge pin D are a loose fit in bushings so that the shoes will center themselves when the brake is applied



NEW TRUCK SALES

Complete Figures for January, 1929,

	Acme	American La France	Atterbury	Autocar	Brockway	Chevrolet	Diamond T	Dodge Bros.	Fargo	Federal	Ford	G. M. C.	Gotfredson	Gramm	Indiana	International	Larrabee	Mack	Moreland	Pierce-Arrow	Relay	Reo	Republic	Rugby	Schacht	Selden	Sterling	Stewart	Studebaker	Whippet	White	Willie-Knight	Total Sales by States Including Miscellaneous
ALA.....Jan.						101		12			121	7				12		1				2								1		257	
ARIZ.....Jan.						31		29			67	13				27		1	1			5		2					6	4	2	2	192
ARK.....Jan. Feb.						80 135	1	36 11	1	3 2	315 185	19 4			1	54 28					15 5		1 1							6 3	8 3	541 379	
CAL.....Jan.	9			8		241	2	255	1	27	1,249	117	4		1	51		38	50	2	1	95	2	13			37	13	20	4	46	3	2,391
COL.....Jan.						134		83		4	218	46				71		4				13	2	2					1	3	8	3	595
CONN.....Jan.				1	3	66		25	5	1	76	13				10		13		1	1	15		1				4	4	3	1	1	245
DEL.....Jan. Feb.				1		14 32		5 3			35 42	4 3				4 4		1 2				1 3		1								2 1	68 91
D. C.....Jan.					2	18	1	3			66	5				2		2				1						1		1	2		107
FLA.....Jan.						65		12			135					6						4							1		1		224
GA.....Jan.						109		10		1	162				5	6		1				1								4	7		306
IDA.....Jan.						14		6			38	1				10		1				2		1							2	1	78
ILL.....Jan.	1		8			400	146	198	19	8	982	121	21		24	313		40		1	5	72	4	4			7	4	3	11	33	5	2,601
IND.....Jan.	1		1			245	5	77	1	9	487	42			17	78					3	38		3				8	9	11	11		1,049
IA.....Jan.				1		148		33	8	2	197	12			2	97		3			1	11		3						1	3		526
KAN.....Jan.*																																	
KY.....Jan.						121	6	43	1		189	28			6	46		4		2	6	17		1	2				5	8	7		494
LA.....Jan.				2		81		18			215	10				27						6								1	4		365
ME.....Jan.						17		2			57	2										2		2									82
MD.....Jan. Feb.				1 6	1	88 112	6 1	23 18		4 2	176 119	12 16				12 17		10 29		2 1		12 16		1		1	1	2 7	1	2 1	13 7		371 362
MASS.....Jan.				15	7	126	4	74	9	5	436	37				39		18				51			1		5	3	3	5	14	1	858
MICH.....Jan.	9			4		368	17	93	13	21	734	48	5			67		7		1	1	43		2	1				3	11	13	1	1,479
MINN.....Jan. Feb.						51 108		38 19	2 1	2 1	219 270	15 17				28 47		4 2				12 19		1					2	5 2	4 5	1	383 497
MISS.....Jan.						43		8			51	1				15						7											125
MO.....Jan.				2		93	7	36			141	14			1	49		11			1	14	1	1			1		1	3	3		383
MONT.....Jan.						55		21	1	2	142	6				29		1		1		8	1	5						2	3	1	278

* Kan. figures not available as yet.

Figures in this table are compiled by R. L. Polk & Company, of Detroit, except Illinois, which compiled by the New Jersey Motor List Co., New Car Division, of Trenton. Readers desiring

April, 1929

The Commercial Car Journal
and Operation & Maintenance

BY MAKES AND STATES

and Partial Reports for February, 1929

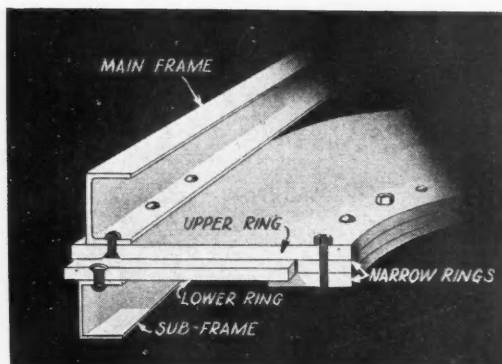
	Acme	American La France	Alfieri	Autocar	Brockway	Chevrolet	Diamond T	Dodge Bros.	Fargo	Federal	Ford	G. M. C.	Godfredson	Gramm	Indiana	International	Larabee	Mack	Moreland	Pierce-Arrow	Relay	Reo	Republic	Rugby	Schacht	Selden	Sterling	Stewart	Studebaker	Whippet	White	Willis-Knight	Total Sales by States Including Miscellaneous	
NEB. Jan.						167	2	41			241	28			5	96		3				10		2						1	4	1	608	
NEV. Jan.						21		20			32	6				4			3												1		90	
N. H. Jan.						3		1			6							1				2											14	
N. J. Jan.	3	2		16	16	161	5			7	37	32	2			32		29		7	5	61					6	4			22		641	
N. M. Jan.						31		20		3	36	3		2		15						4								1	2		118	
N. Y. Jan.	4	2	3	20	95	530	32	274	44	17	876	70				127	10	66		17	4	94	1	14	1	10	11	36	8	16	30	1	2,434	
N. C. Jan. Feb.	7			1		204 350		68 60	1 3	4 1	375 339	42 21			5	26 20		3 7				11 4	1 1	3 1				1 2	1 1	3 10	3 4		775 828	
N. D. Jan. Feb.						63 42		8 4		1	79 47	9 6				51 42						3 5		2 1					1	1		1	217 149	
OHIO. Jan.	5			6	1	454	15	102	8	13	624	57	1	11		96		12		1	1	57	2	5		2	2	4	7	24	40	1	1,572	
OKLA. Jan.						144	2	61	6	12	322	15			1	60		9			1	16		1				4	1	15	7		681	
ORE. Jan.						81		32	3	6	262	23				23		3	4			10	2	4					6	3	14		488	
PA. Jan.	3			36	33	317	22	191	17	5	900	81	10			98	1	45		2	9	60	6	6		2	22	13	15	22	45	4	2,002	
R. I. Jan.				2		19	1	21		3	44	9				8		1		1		15		2				4			2		134	
S. C. Jan. Feb.						157 135		30 10	1	4	207 111	16 6			1	28 14						5 1		2				1	1	3	1	2		457 280
S. D. Jan. Feb.						47 73	2 2	14 27	1	1	105 102	9 11	1	1	1	56 80		4 1				7 12		2 4						2	1	2		249 319
TENN. Jan.						161		28	3	5	115	33				15		5				8	2						5		2	1	383	
TEX. Jan.	2			7		470	16	90	11	6	901	67		4	205		13		1	11	36		7				4	9	12	23		1,906		
UTAH. Jan.						23		19			79	4				14		6	1			5		1					2	1	1		156	
VT. Jan. Feb.						12 32		10 9	2 1	4	22 44	7 3				7 7		1 1				6 4						1 1	3	2	2			76 105
VA. Jan.				2		86	1	45	1	10	274	17		6	37		3					13	10					1	1	3	12		523	
WASH. Jan.						178		83	2	5	392	42				50		5	1			45	1	5					4	7	10		861	
W. VA. Jan. Feb.						45 86	1 3	15 13	3 1	1 1	121 96	11 8				26 10						11 10		1 1				2	1 1	2	2		243 236	
WIS. Jan. Feb.				1		85 168	8 18	38 28	6 3	8 4	430 347	23 15				27 40		3 3		1		18 17		2 3		10 10	5 7	3 3	3 6	1 4		692 694		
WYOM. Jan.						1		17			31	1				4						2		1									57	
TOTAL. Jan. Sales by Makes.	40	8	3	135	157	6,169	302	2,368	169	204	13,019	1,178	43	92	2,158	11	372	60	38	52		946	35	103	5	14	101	113	121	204	412	31	29,375	

is compiled by the Robinson's Advertising Service, of Springfield; and New Jersey, which is town and county lists of owners in any section may address any of these three companies.

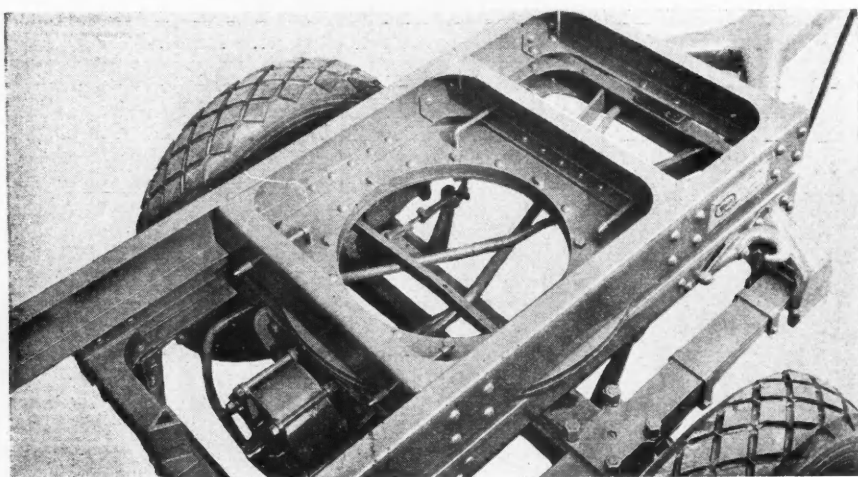
The Commercial Car Journal
and Operation & Maintenance

April, 1929

MACK BUILDS 4-WHEEL



Five and Ten-Ton Trailers, New Line of Dump Bodies, Ratchet on AB Chain-Drive Service Brakes and Engine Thermostats Announced



MACK TRUCKS, INC., is now building two models of four-wheel trailers, of 5 and 10-ton capacity, and a new line of dump bodies rated from 2½ to 7½-ton or from 2½ to 10-yd. The company also has changed the design of service brakes on its AB chain-drive trucks and incorporated thermostatic control of cooling water temperatures in Mack engines.

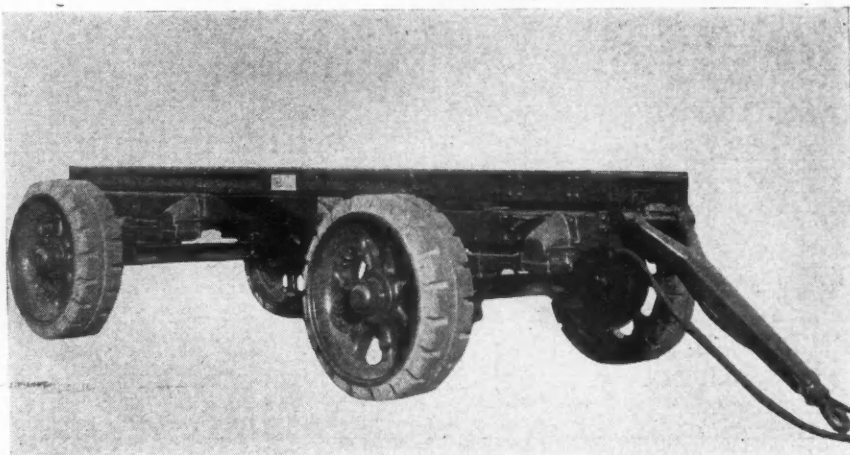
The trailers incorporate a main frame and two sub-frames, one of which is normally rigidly attached to the main frame by bolts through lower flange and the other through a centerless, ring-type fifth-wheel of large size. The front sub-frame includes a BK vacuum booster which operates internal brakes on the front wheels through a cross-shaft and levers mounted directly on the brake camshafts. While the non-reversible type is standard, the company is prepared to furnish the front-end fifth-wheel construction including brake equipment at both ends of the trailer, for use in reversible work. The main frame is assembled of flexible, pressed-steel rails and four channel cross-members with integral

Views of the ring-type fifth-wheel. It consists of two wide flat rings, the upper fixed to the main frame and the lower to the sub-frame. Both are of the same outside diameter, but the upper is wider than the lower. In order to form a groove in which the lower ring can ride, two narrow rings are fastened by bolts to the inside diameter of the upper ring. The greater width of the lower narrow ring forms the groove. Fifth wheels of this type distribute the draw-bar pull over a large area. Two of the four Alemite lubricator connections are shown in the photograph

gussets, hot-riveted. Front and rear sub-frames are of the same design to facilitate production.

Both 5 and 10-ton models are similar in construction, larger parts being used in the 10-ton model. Wheel and tire equipment is optional, pneumatic tired disk wheels or solid tires on steel wheels being furnished. Springs are semi-elliptic mounted on Mack rubber shock insulators. Axles are standard chain drive truck axles, drop forged, I-beam section. Front and rear wheels are the same and brake drums are bolted to the front wheels. Two hooks are mounted on the front sub-frame, immediately in back of the front spring hangers. The draw-bar is a yoke-type steel casting anchored to the front sub-frame by trunnions. The towing eye is a steel forging, swiveled and without a

Mack four-wheel, non-reversible trailer. Note the similarity of the sub-frames. Brackets on the main and sub-frame form a groove into which a square-section bar can be slipped horizontally to provide a steering lock



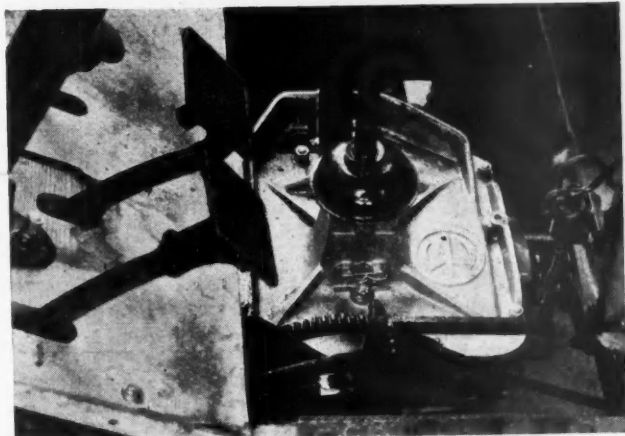
HEAVY-DUTY TRAILERS

spring, which fits the standard type of pintlehook.

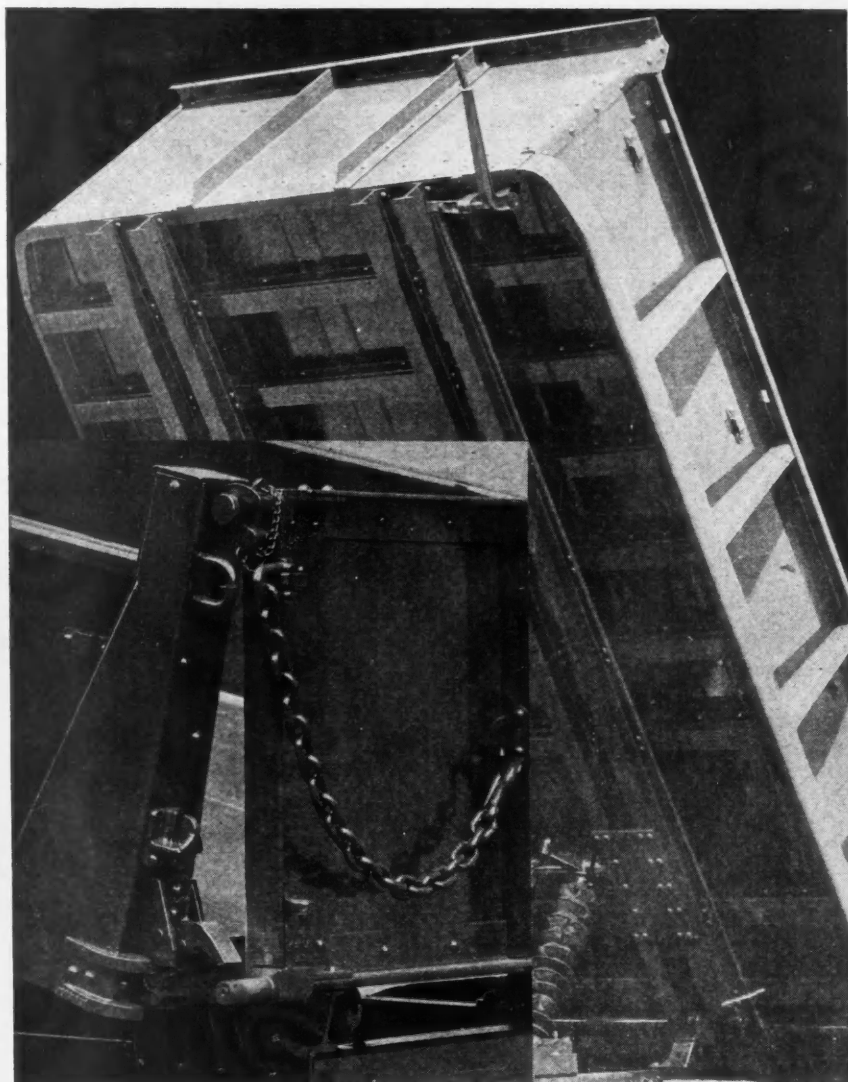
The body line is offered in nine capacities for mounting on 146, 156 and 162 in. wheelbases on AB, AK and AC chassis. Built of 7-gage sheet steel, the bodies have a 4-in. taper from front to rear. The understructure consists of two sets of closely coupled I-beams designed to slip over wood side sills when the body is in the lower position and eight cross-channels. These cross-members extend six inches beyond the side of the body-box proper to the edge of the side running boards. Sheet steel forming the side running boards is wrapped around the ends of the cross-members to provide a smooth rub rail. The front corners of the boards are rounded, forming a corner body bumper. Headboard and tail-gate are built higher than the rest of the body so as to provide uniform height when standard side-boards are used.

To meet special requirements standard dump body attachments (Turn to page 48, please)

*Latch controlled
ratchet on foot
brake of chain drive
Mack AB trucks*



*The Commercial Car Journal
and Operation & Maintenance*



Liberal number of underbody cross-members supports floor and prevents distortion. Note rounded corner of running board and side-board sockets. A combination of 4 x 6 x 1/2 in. angle iron riveted to the body side panel in an upright position and a 7-gage sheet steel housing forms the tail-gate post. This construction prevents accumulation of materials and provides a post substantial enough to withstand severe blows. Tail-gates are double-acting, reinforced with 3-in. angle irons and corner braces. Change to bottom hinge action is accomplished by removing two keeper pins and attaching chains

Mack Trailer Specifications

	5-Ton	10-Ton
Wheelbase	105	116
Tread	63 1/4	74 1/2
Turning radius	46 ft. 6 in.	50 ft.
Chassis weight, total	4600 lb.	6000 lb.
front	2990	3900
rear	1610	2100
Body allowance, total	1500	2000
front	750	1000
rear	750	1000
Frame and sub-frame		
depth, width, thickness	6 1/4 x 2 1/4 x 1/4 in.	6 1/4 x 2 1/4 x 1/4 in.
height loaded, front	38 in.	38 1/4 in.
rear	36 1/4 in.	37 1/4 in.
Axles		
depth, width and thickness	3 1/2 x 1 1/8 x 1 3/16	4 1/4 x 2 1/4 x 1 3/16
Wheels, cast steel	5-spoke	7-spoke
Springs, front and rear		
number of leaves, length,		
width	12-53 x 3 1/2 in.	10-56 x 4 in.
shock insulators	AB type	AK type
Brakes		
Diameter	18 in.	20 in.
Width	3 1/2	3 1/2
Braking surface	259 sq. in.	287 sq. in.
Tires, Solid, all around	36 x 7 in.	36 x 10 in.
		38 x 7
Pneumatic, extra	36 x 8	40 x 8



The Chevrolet light delivery chassis equipped with panel body

A Six-Cylinder Truck with the Economy of the Four . . . Ideal for Fleet Users

Offering all the brilliant performance advantages of a great new six-cylinder valve-in-head engine—yet amazingly economical, both to own and to operate—the new Chevrolet trucks are meeting with unrivaled popularity among users in every line of business.

Never before has Chevrolet's leadership in quality and value been so decidedly pronounced. Six-cylinder performance—with its greater reserve power, higher speed, faster acceleration and smoother operation! Marvelous handling ease—the result of a full ball bearing steering mechanism, powerful

4-wheel brakes, and a positive, smooth-acting dry disc-clutch! Rugged dependability—assured by a heavy channel steel frame, massive banjo-type rear axle housing and scores of additional features of advanced design! And all available in the price range of the four.

See your Chevrolet dealer today.

He can provide you with Chevrolet six-cylinder trucks designed especially for your business that will combine dependable six-cylinder transportation with the outstanding economy of the four!

1½ Ton Chassis. \$545

1¼ Ton Chassis with Cab \$650

Sedan Delivery. . . \$595

Light Delivery Chassis. \$400

All prices f. o. b. factory
Flint, Michigan

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

A SIX IN THE PRICE RANGE OF THE FOUR

AFTER

Week

The national truck week idea advanced as a substitute for the national truck show, which was abandoned by the truck membership of the National Automobile Chamber of Commerce, holds possibilities for fruitful development. The only thing to be feared is that if it isn't properly handled it may be plastered with a stigma classifying it with eat-an-apple, wrestle-a-raisin, wear-a-clean-collar and such-like weeks. That, of course, is exaggerating matters quite a bit.

Truck week ought to take the form of individual and cooperative localized dealer effort.

Individually, each dealer ought to doll up his establishment; set up a complete and attractive exhibit of his truck products under his own roof; extend his owner and prospect lists a written invitation to view it; arrange contests among salesmen and resort to various other methods of stimulating interest, attendance and sales.

Collectively, the dealers in each community ought to advertise truck week in the local newspapers; generate news articles on truck topics calculated favorably to stir the public mind to truck consciousness; solicit expressions on truck matters from city officials; sponsor, if possible, a transportation banquet, inviting truck operators, business men, city officials and the general public, and get a speaker or two to talk interestingly on pertinent topics.

Truck week with competitive features is not only inadvisable but very likely to meet with the disapproval of most dealers. Any such break-up of truck week into hill-climb testing day, speed-testing day, brake-testing day, etc., had better be an individual undertaking.

National truck week is not yet an assured fact. The truck division of the National Automobile Chamber of Commerce is delving into its potentialities and approval may and may not be accorded it. But if it is pigeon-holed as a national proposition, the idea appears to possess sufficient advantages to recommend it for local adoption.

Teeth

The Parker Bill was not among those ground out by the lame-duck session of Congress as legislative meat. This much must be known to everyone since there has been no trumpeting of celestial horns heralding a millennium in the bus-operating field. It is not as well known, however (and



our own knowledge is not from a source that might exactly be termed unimpeachable), that the bill was retained in committee because of the indefiniteness of some of its provisions and the absence of stipulations commonly referred to as "teeth."

When a law has teeth it generally bites somebody, and if some bus-men who supported regulatory legislation get the feeling that the law eventually framed may bite the hand that led it, their depression may be entirely excusable.

Truck operators, it is our opinion, would not waste their time if they exhorted the fates to guide the committee along lenient lines, and, if it must put teeth into the law, inspire it to pick a set of milk teeth. We say this for two reasons that seem to us good: first, because the bus legislation passed will be used as a precedent when trucks come up for interstate regulation, and the harder it is on buses the harder it will be for trucks; and second, because the sharper the teeth the quicker will bus interests be bitten into envious action fomenting interstate regulation of trucks.

After all, buses and trucks are brethren



HOURS

ren of the highway, and if the bus should become of the opinion that it was getting step-child treatment it would be sheer display of human nature to yodel the complaint to the wide world with a chorus of such unusual arguments as "unfair discrimination, rank injustice and brazen highway robbery," and wind up with a "what's sauce for the goose is sauce for the gander." The fact that the wound was self-inflicted would quite naturally be forgotten, and certainly could not be used by the truck interests in self defense.

Are bus interests even now kindly disposed toward their truck brethren? You can form your own impression by reading the following extracts from a bus association bulletin:

"The idea that buses earn money for their operators on the public highways and that trucks do not is fantastic. Where do trucks earn an income on their costs? Surely not sitting in the garage. Trucks are loaded to their capacity or beyond it a far greater proportion of the time than are buses, which for far the greater part of the mileage operated carry comparatively light loads. The bus operator has no quarrel with the truck operator, but the unfairness (*sic*) of the tax against the bus operator is so strongly brought out in comparison with the tax against the truck operator that we are using it as an example."

All of which actually means that the bus operator already is quarreling with the truck operator.

And if their legislative venture boomerangs, it would be altogether too much to expect the bus interests to sit idly by, twiddle their thumbs in suffering silence and permit the truck field to enjoy the peace of an unregulated interstate existence until a real need for it developed.

Drivers

In tests made by the Massachusetts motor vehicle registration department it has been found that drivers of trucks are far less irresponsible than the ordinary driver of a passenger car, and that they react 100 per cent faster in emergencies. This in spite of the fact that truck drivers cover a great deal more mileage and travel in the more congested areas where the accident risks are much more numerous. This, as operators well know, is giving public opinion a slap in the beezer. And well it deserves it. —G.T.H.

FREEMAN IN 3-TON CLASS

Two Four-Wheel Drive Units Offered in 144-in. and 186-in. Wheelbases

FREEMAN MOTOR CO., Detroit, Mich., has added two 3-ton models to its line of four-wheel drive trucks. The new units, a dump job of 144-in. wheelbase and a long chassis of 186-in. wheelbase, are lighter and faster than other Freeman trucks and are intended for commercial work as well as for highway maintenance and snow removal.

The Freeman bevel gear front wheel drive, which makes universal joints in the front axle drive unnecessary, which is a feature of the heavier models, is employed in the lighter units. Both front and rear axles are dead end bevel gear and differential assem-

blies are mounted above them in housings. Rear wheels are driven by internal gears.

A four-speed transmission mounted in a unit with the engine and an auxiliary transmission mounted amidship provide transmission ratios ranging from $8\frac{1}{2}$ to 1 in high to 147.57 to 1 in low.

Both hand and service brakes operate on all four wheels. The service brake is of the contracting type operating on a drum 10 in. diameter and 7 in. face which is integral with the reduction gear in the auxiliary transmission. The hand brake operates on a drum on the driveshaft braking through the

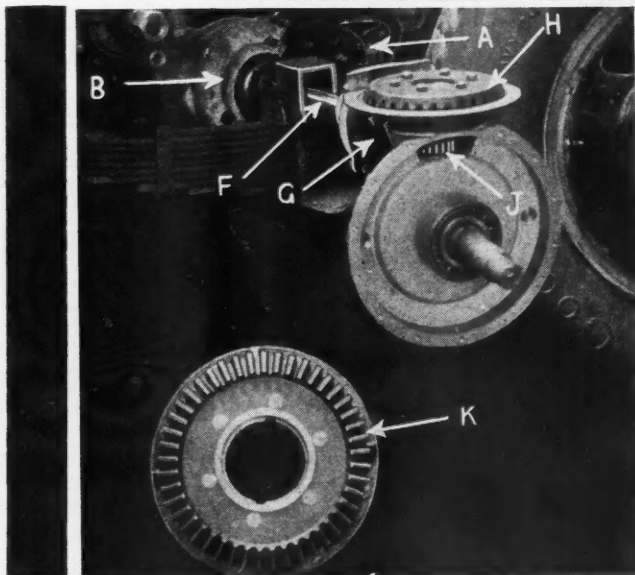
Specifications of Freeman 3-Ton Models

Chassis capacity	7500 lb.
Wheelbase, standard	
dump chassis	144 in.
long chassis	186 in.
Weight chassis	7250 lb.
Engine, make	Buda DW 6
size	6-3 $\frac{1}{4}$ x5
hp.	60
Carburetor	Stromberg
feed	vacuum
Gasoline tank, capacity	30 gal.
location	under seat
Ignition	Robert Bosch magneto
Radiator	Long
type	tubular
Generator	Robert Bosch
Starter	Auto-Lite
Clutch	Fuller HU16
type	disk
Transmission, main	Fuller HU16
speeds	4
mounted	unit
auxiliary mounted	amidships
ratio	direct and 2.65 to 1
Rear axle	dead
type drive	internal gear
ratio	8.5 to 1
Front axle	dead
type drive	triple bevel gear
Drive and torque	springs
Steering gear	Wohlrab
Service brake, Type	external
mounted	propeller shaft
Hand brake	driveshaft
Springs, front	54x4
rear	52x4
Wheels	forged steel
Frame, channel	7 x 3 $\frac{1}{2}$ x 5/16
Tires, dump chassis	
front	34x7
rear	34x7 dual
Tires, long chassis	
front	36x7
rear	36x7 dual
Chassis lubrication	Alemite

drive on all four wheels.

Standard equipment includes cab, Gruss Air Springs and front bumper.

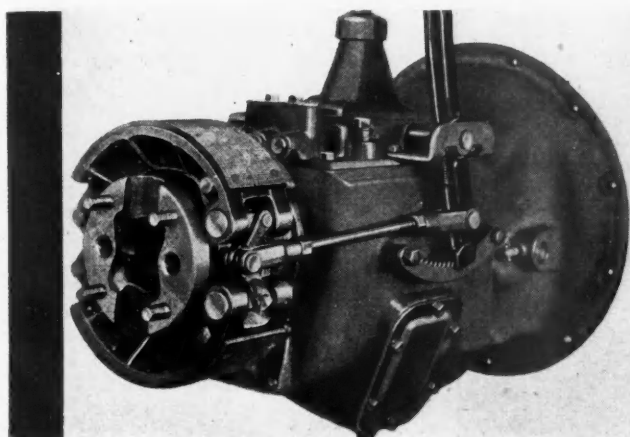
All models in the Freeman line have a chassis capacity rating which includes weight of body and pay load. The Freighter, 5-ton dump and 5-ton long chassis have chassis capacity of 15,000 lb. Corresponding rating of the 3-ton units is 7500 lb.



Above: The new Freeman four-wheel drive 3-ton dump truck chassis lists at \$4500 with full equipment. Left: Each front wheel of a Freeman truck is driven by a double bevel gear assembly which has no universal joints. From the forward propeller shaft A power is transmitted through a bevel gear and differential mounted in a housing B over the front axle. Drive shafts F operate bevel gears G which mesh with horizontal bevel gears H. Below the horizontal bevel gear is a smaller gear J which meshes with a ring gear K on the hub

FEDERAL OFFERS LOW PRICE 1½-TONNER

Model F-7 Equipped With
Continental Six, Unit-Mounted
4-Speed Transmission and 4-
Wheel Hydraulic Brakes



Specifications of Federal F-7

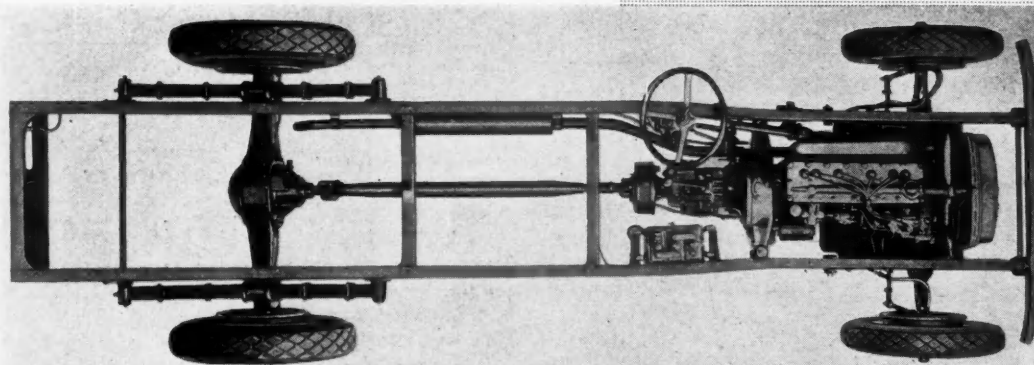
Model	F-7
Capacity	1½ ton
Price	\$1,395
Chassis Weight	3450 lb.
Body Allowance	800 lb.
Load Capacity	3000 lb.
Wheelbase, standard	132 in.
optional	144, 152 in.
Engine, make	Continental 16-C
size	6-3/4 x 4 1/2 in.
displacement	248.2 cu. in.
hp. at 2700	65
Carburetor, feed	vacuum
Gasoline tank, location	under seat
capacity	20 gal.
Cooling, type	tubular
Clutch, type	plate
Transmission, speeds	4
direct on	fourth
mounted	unit
Universals, number	2 in 132 in. W. B.
	3 in others
Rear Axle, make	Timken
type	full floating, bevel
ratio standard	4-6/7 to 1
ratio optional	5-5/6 and 6-4/5
front and rear tread	57 in.
Drive and Torque	Springs
Steering gear, type	worm and sector
Service brake, type	Lockheed 4-wheel
	hydraulic
drums front	15 x 2 1/4 in.
drums rear	16 x 2 1/4 in.
Hand Brake, location	driveshaft
type	expanding
size	9 x 3 in.
Springs, front	38x2 1/2 in.
rear	50x2 1/2 in.
Wheels type	cast steel spoke
rim	20 in.
Tires, front	30x5 in.
rear	34x7 in.
Frame, depth	5 1/2 in.
flange	2 1/2 in.
thickness	1/4 in.

ing space to house the body and cab plant and shipping facilities.

Pistons of the L-head engine are cast iron. A new development with Federal is the unit mounting of the four-speed, transmission with direct speed on fourth. Bearings are of the anti-friction type. Lubrication of the clutch throw-out bearing is by means of an oil cup on the clutch housing.

The two larger wheelbase jobs have two-piece propeller shafts, three universal joints and self-aligning center bearings, while the standard wheelbase model has a one-piece tubular shaft.

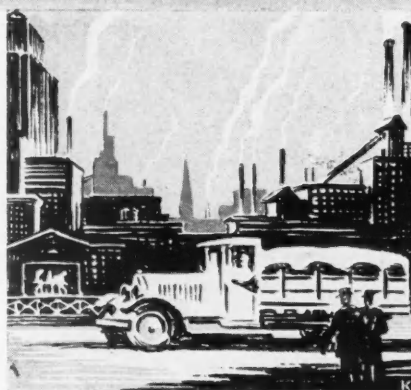
Service brakes are hydraulic with self-compensating master cylinder. The hand brake is of the internal two-shoe propeller shaft type, the shoes of which are mounted in back of the transmission and the drum made integral with the front universal flange.



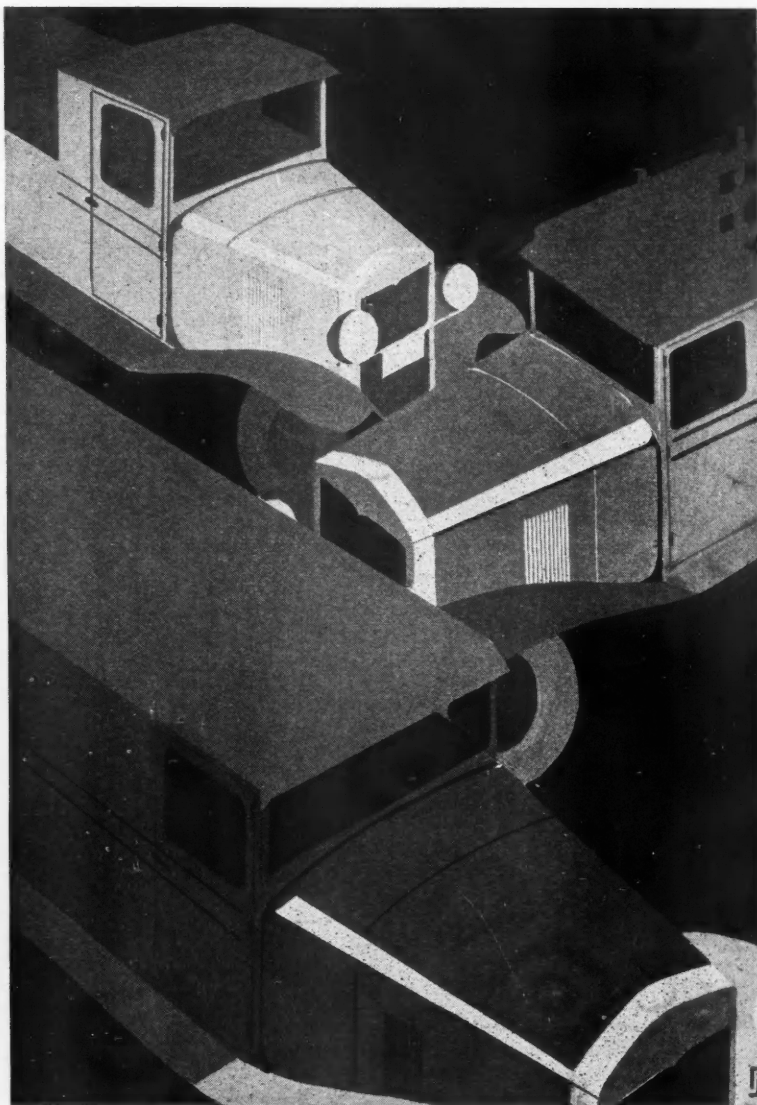
WITH a chassis price of \$1,395, Model F-7 just introduced is the lowest price 1½-ton model ever produced by the Federal Motor Truck Co. This new unit, offered in three wheelbases, is equipped with a six-cylinder Continental 16-C engine, unit mounted four-speed transmission and four-wheel hydraulic brakes. Low price is said to be due to lower production cost made possible by a large production schedule and the completion of additional manufactur-

Top: Hand brake on the new Federal F-7 showing mounting of cast shoes on rear of transmission. Shoes are expanded by toggle joint operated by one short rod connected directly to the hand lever

Above: Showing how frame of 1½-ton Federal widens toward the rear



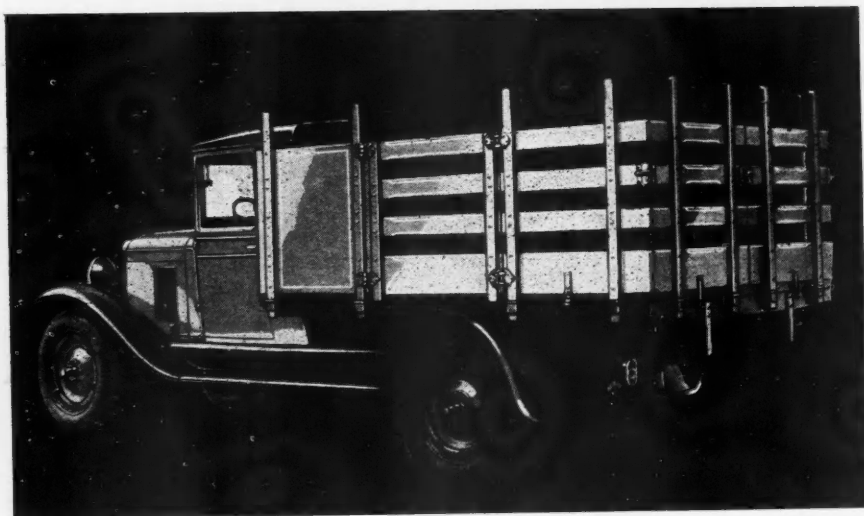
HERCULES BODIES FOR



More Than 50 Stock
press, Stake and
signed for 1929
1½-Ton

A LINE of bodies and cabs to meet practically every service in which 1929 Chevrolet Light Delivery and Utility 1½-ton chassis are used is offered by Hercules Products, Inc., Evansville, Ind. The line consists of more than 50 models including panel bodies; open and canopy top express bodies with or without screen sides; platform and stake bodies; and hand hoist, automatic and mechanically operated dump bodies. Each type is offered in several different lengths, widths and heights.

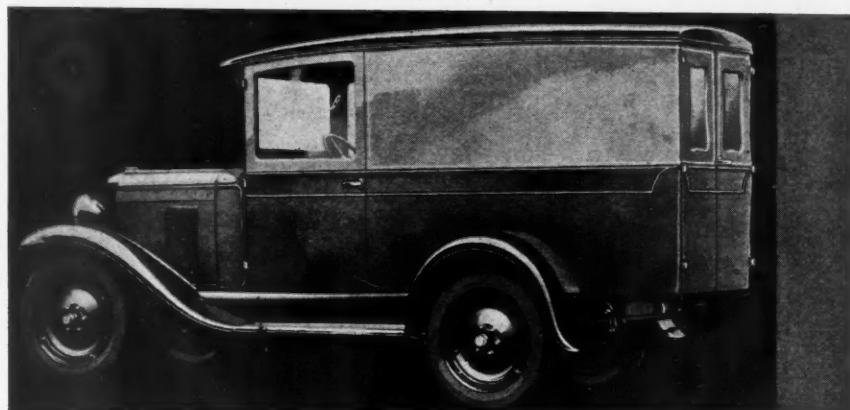
Among the features characterizing the Imperial and Standard bodies: Three-ply veneer panels covered with felt and automobile sheet steel specially assembled to allow for expansion and contraction are used in the panel bodies. Panels are steel braced to roof and floor. Rear corners are a rounded continuation of side panels, eliminating moldings. Door steel panels also are extended, making weather stripping unnecessary. Rear doors are full height and width and carry two large windows in the upper sections. All door hardware is nickel-plated. Glass is framed



Hercules No. 1972 platform body with stakes and panel mounted on a 1½-ton Utility. When specified, a 20-in. drop end gate with chains can be supplied instead of end stake sections

CHEVROLET CHASSIS

Models of Panel, Ex-Dump Types De-Light Delivery and Trucks



No. 1918 Imperial de luxe panel body for Chevrolet Light Delivery

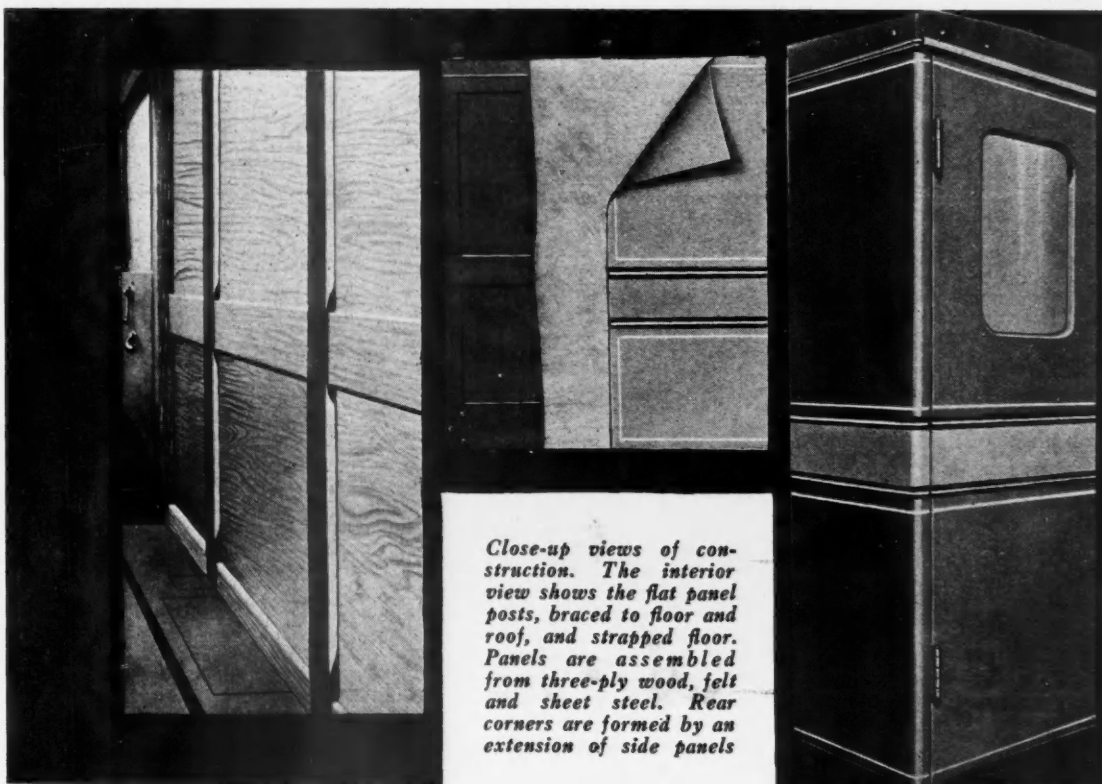
in metal. Windshields are one-piece plate glass and equipped with wipers and rear vision mirrors. Seat boxes are metal and carry twin-spring tan upholstered cushions. The seat next to the driver is hinged and when thrown forward affords 15 in. extra space.

The cabs are very similar to the front-end construction of the panel bodies, except that the backs are solid and carry look-out windows. Cab doors are 30 in. wide, hung on three steel hinges and of the sedan vestibule type. Door control is remote and window regulators are of the high-speed type. The roof is full-slatted with hardwood rails. A four-way steel gusset plate ties seat frame, sides, back and bottom sills in one solid unit. Front corner posts are small for better vision.

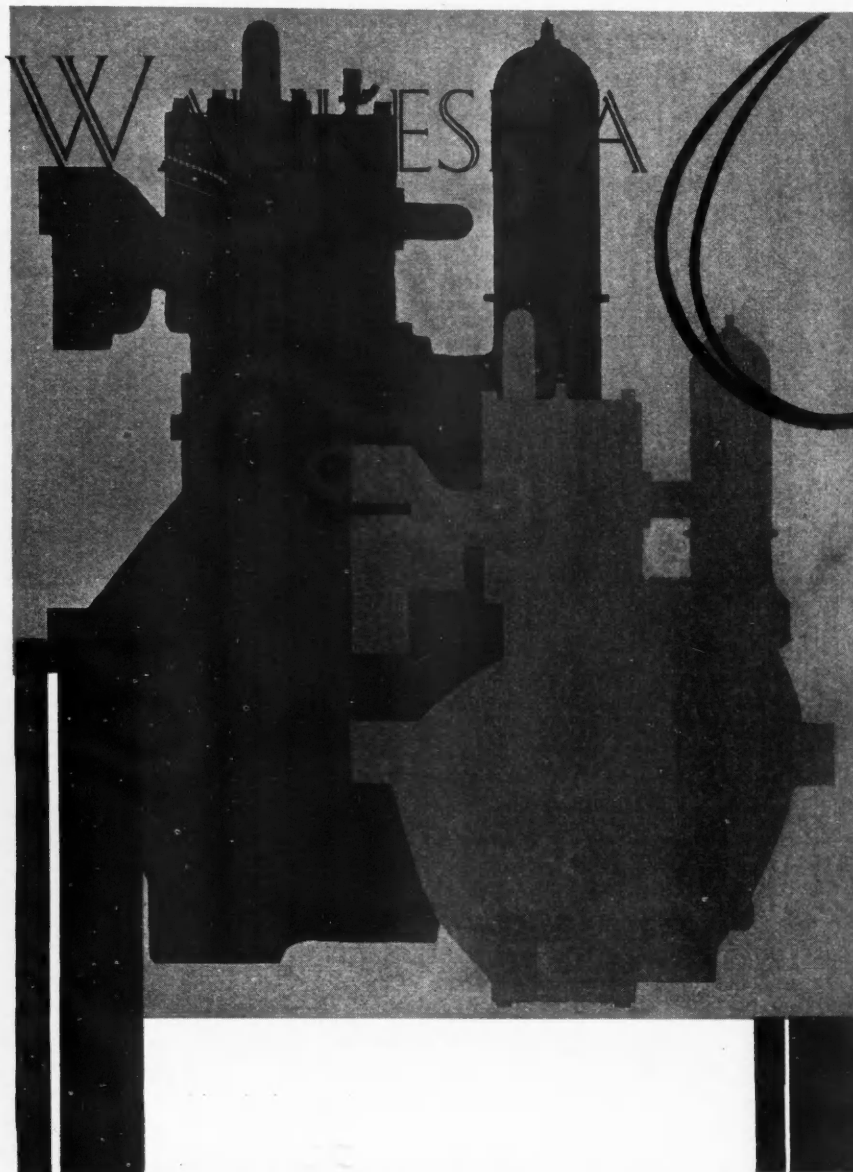
More than 15 models of dump bodies for mounting on the 1½-ton Utility chassis are offered in capacities ranging from 1 to 2½-cu. yd. and in length, width, and height dimensions ranging from 78 to 120 in., 48 to 60 in., and 10 to 18 in. respectively. Some have 22 in. tail-gates.

Dimensions of part of the Hercules line follow:

	Model	Ton	Length in.	Width in.	Height in.	Height of side panels or stakes in.	Width Between Wheelhouses in.
Panel	1918	Delivery	72	45	51½	....	....
	1914	Delivery	72	45	53½	....	....
	1514	Delivery	70	44¾	51½	....	....
	1515	1½-Truck	100	44½	55	....	....
	1928	1½-Truck	112	50	55	....	45¼
Express Open	1945	Delivery	72	45	....	14	....
	1912	1½-Truck	93	58	....	16	....
	1900	1½-Truck	108	44	....	14½	....
	1901	1½-Truck	96	44	....	14½	....
Express Canopy Top	1922	Delivery	108	44	....	14½	....
	1921	Delivery	96	44	....	14½	....
	1536	Delivery	70	44¾	51½	14	....
	1936	Delivery	72	45	53½	14	....
	1911	1½-Truck	112	50	55	14½	45¼
Express Canopy Top Screen Side and Rear	1920	Delivery	96	44	....	14½	....
	1923	Delivery	108	44	....	14½	....
	1535	Delivery	70	44¾	51½	14	....
	1935	Delivery	72	45	53½	14	....
	1910	1½-Truck	112	50	55	14½	45¼
Platform Stake & Panel Body	1972	1½-Truck	106	75	....	42	....
	1968	1½-Truck	98	72	....	36	....



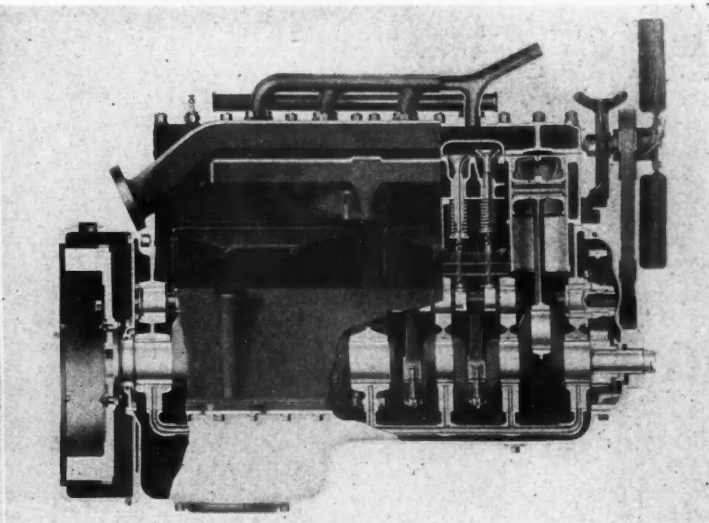
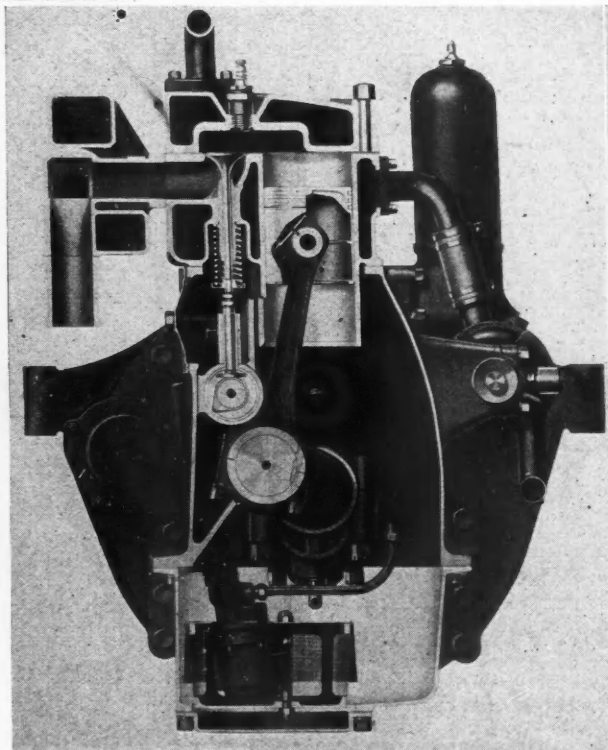
Close-up views of construction. The interior view shows the flat panel posts, braced to floor and roof, and strapped floor. Panels are assembled from three-ply wood, felt and sheet steel. Rear corners are formed by an extension of side panels



'S TURN

WAUKESHA MOTOR CO., Waukesha, Wis., is building two new six-cylinder engines for high speed commercial vehicles. Both models are designed to develop high power output at moderate speeds and thereby provide high vehicle speed with fast rear axle gearing rather than by high engine speeds. The larger engine, designated the Big Six, 6RB, is intended for use in high speed heavy trucks and buses. The Transport Six, 6SRL, is designed for 2½ to 3½-ton speed trucks.

Both engines incorporate Waukesha design girder type crankcase, cylinders with lower edge considerably below the top of the crankcase and Ricardo cylinder heads. The engines differ in construction of a number of parts, among them being: crankcase, main bearings, cylinder heads and connecting rod bearings. The Big Six has aluminum alloy crankcase, four main bearings, three cylinder heads and remov-



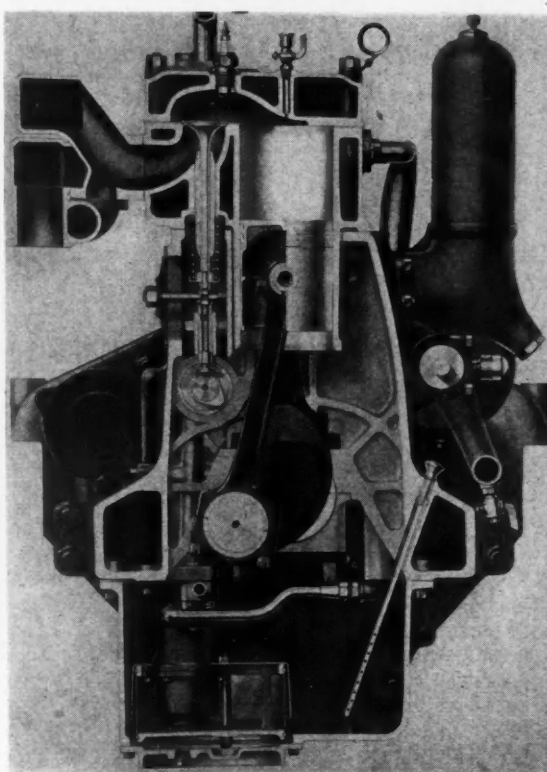
The new Waukesha Transport Six has cylinders 4⅜ by 5⅞ in. giving piston displacement of 462 cu. in. and develops 75 hp. at 1500 r.p.m. The crankshaft has 3 in. main bearings and the center bearing is 3 in. long. The girder type iron crankcase extends to a flange on the cylinder at the bottom of the water jacket, the cylinders extending into the crankcase. The Hall-Winslow oil filter is built-in. Two separate Ricardo cylinder heads are employed. Oil pump screen is vertical and is covered by a sheet metal bell

AT MODERATE SPEEDS

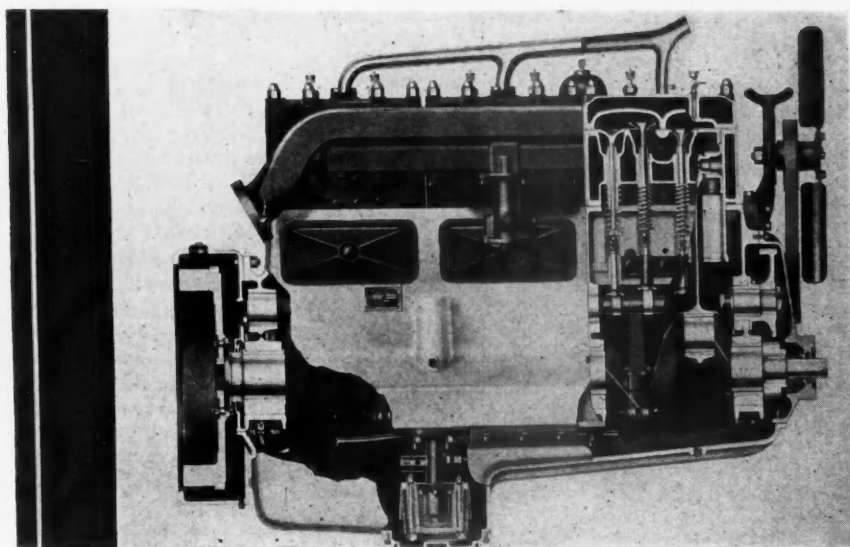
Specifications of Waukesha Engines Models 6RB and 6SRL

	6RB	6SRL
Bore and stroke	5 x 5 1/4	4 3/8 x 5 1/8
Displacement	677 cu. in.	462 cu. in.
Hp.	105	75
r.p.m.	1300	1500
Crankshaft material	chrome nickel steel	S.A.E. 1045 steel
number of main bearings	4	7
size of journals	3 1/2 in.	3 in.
length, front bearing	2 3/8 in.	1 7/8 in.
length, second bearing	2 3/8 in.	1 1/2 in.
length, third bearing	2 3/8 in.	1 1/2 in.
length, fourth bearing	2 3/8 in.	3 in.
length, fifth bearing	2 3/8 in.	1 1/2 in.
length, sixth bearing	2 3/8 in.	1 1/2 in.
length, rear bearing	3 1/2 in.	3 in.
Main Bearings	removable	removable
Crankcase	aluminum	cast iron
Connecting Rods		
bearing diameter and length	2 3/4 x 2 1/2 in.	2 1/4 x 1 3/4 in.
type	removable	cast in
length C to C	13 1/4 in.	10 1/4 in.
Cylinders		
material	chrome nickel iron	chrome nickel iron
cast	pairs	en bloc
Valves		
inlet	chrome nickel	chrome nickel
exhaust	Silchrome	Silchrome
Camshaft		
diameter	1 7/16 in.	1 3/8 in.
timing gears	carbon steel and cast iron	semi-steel and steel
width	1 1/2 in.	1 1/2 in.
Piston		
material		aluminum alloy *
number of compression rings	3	3
width	1	1/4 in.
number of oil control rings		1
width		3/16 in.
Pin locks in	rod	rod
Size pin bushing	1 1/4 x 2 15/16 in.	1 x 2 1/4 in.
Weight approximate	1300 lb.	1150 lb.

* Cast iron optional.



Cut-away view of Big Six. Valves are reached through openings in the crankcase rather than the cylinder block. Girder crankcase and cylinders which extend into crankcase are similar in design to Transport Six. Note difference in shape of combustion chamber in Ricardo cylinder head



The Big Six has aluminum alloy crankcase and oil pan. The crankshaft is supported in four main bearings. Full force feed lubrication is employed, the oil supply manifold being attached to the main bearing bridges. Cylinders are 5 by 5 1/4 in. and the engine develops 105 hp. at 1300 r.p.m.

able connecting rod bearings, while the Transport model incorporates cast iron crankcase, seven main bearings, two cylinder heads and cast-in connecting rod bearings.

Flywheel housings are detachable on both models. Provision is made for starters and electric generators with S.A.E. mounting. A Waukesha built-in governor and air compressor drive and mounting are supplied if desired as extra equipment.

Special attention has been given to design of cooling systems of these engines. The pump develops five times the pressure of an ordinary pump and water is directed around each valve seat. Water jackets may be cleaned through large openings.

6 FOUR-WHEEL-DRIVE 6'S ADDED BY COLEMAN

Special Shoulder-High Dump Body on "Roadster"

COLEMAN MOTORS CORP., Littleton, Colo. and Washington, D. C., is building six new four-wheel drive trucks in addition to models previously announced. A 2½-ton, 3½-ton, two 5-ton and two 7½-ton models comprise the new units.

A feature of the Model D-40-X, of 3½-ton capacity, is a special Wood hydraulic hoist and body which is mounted very low, only 56 in. from ground to top edge of body, with a dumping angle of 70 degrees.

Designated the "Roadster" this truck was designed for highway maintenance and snow plow work. The low mounting and low body sides facilitate hand loading of rock over side of body or occasional shovel loading. Front and tail gate are high and there is a hinge at the end of body rail so that the load may be stock piled when dumped, even with the low mounting. Dual rear

Specifications of Coleman Trucks

Model	C25D	D40X	X-100	X-100F	F75	F75S
Capacity	2½	3½	5	5	7½	7½
Wheelbase, standard	109	130	144	144	144	144
optional	144	184	184	184	184	184
Weight chassis	6400	8900	9660	9820	10400	10400
Engine, make	Buda DW6	Buda BA	Buda BA6	Buda GL	Buda GL	Buda GF
size	6-3¼x5	6-4½x5½	6-4½x5½	6-4½x6	6-4½x6	6-4½x6
Carburetor	Zenith	Zenith	Zenith	Stromberg	Stromberg	Stromberg
feed	vacuum	vacuum	vacuum	vacuum	vacuum	vacuum
Gasoline tank	side of	side of	side of	side of	side of	side of
location	frame	frame	frame	frame	frame	frame
Ignition	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy
Radiator	Perfex	Rome-Turney	Rome-Turney	Perfex	Perfex	Perfex
Generator & Starter	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy	Delco-Remy
Clutch type	Fuller disk	Fuller disk	Fuller disk	Fuller disk	Fuller disk	Fuller disk
Transmission, main	Fuller GU14	Fuller RU16	Fuller RU16	Fuller HU16	Fuller HU16	Fuller HU16
speeds, forward	8	8	8	8	8	8
mounted	unit	unit	unit	unit	unit	unit
Rear Axle type	Wisconsin double red.	Wisconsin double red.	Wisconsin double red.	Wisconsin double red.	Wisconsin double red.	Wisconsin double red.
ratio	8.33	8.33	8.54	8.54	8.54	8.54
Front Axle type	Wisconsin double red.	Wisconsin double red.	Wisconsin double red.	Wisconsin double red.	Wisconsin double red.	Wisconsin double red.
Drive and Torque	springs	springs	springs	springs	springs	springs
Steering Gear	Ross	Ross	Ross	Ross	Ross	Ross
Service Brake	rear wheels	rear wheels	rear wheels	rear wheels	rear wheels	rear wheel
Hand Brake	Tru-stop	Tru-stop	Tru-stop	Tru-stop	Tru-stop	Tru-stop
Tires, front	38x7	40x8	42x9	42x9	42x9	42x9
rear	38x7	40x8	42x9	42x9	42x9 dual	42x9 dual

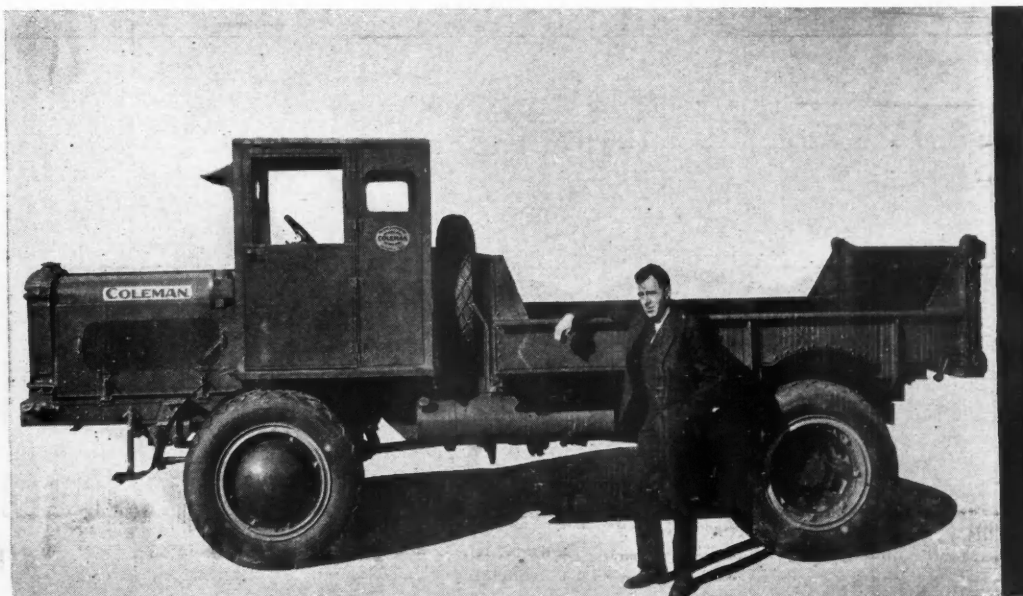
The Coleman "Roadster" truck is equipped with a special Wood hydraulic hoist and body. Sides of body are low enough to allow hand or shovel loading over them. Chassis is rated at 3½ to 5 tons and the body is of 3-yd. capacity

tires are mounted to prevent rocks getting between them. Body is 84 in. wide and 114 in. long.

Chassis design in general follows practice of Coleman Motors Corp. and embodies a Buda 6-cylinder 4½ by 5½ in. engine, Model BA-6; amidship transmission providing eight speeds forward and two reverse, and drive through two Wisconsin double-reduction axles. Front wheels are driven by the Coleman design of universal joint, incorporated in wheel.

Service brakes are on rear wheel drums but affect all four wheels through the drive system. Westinghouse vacuum amplifier is standard equipment. The hand brake is an 18 in. Tru-stop disk which also affects four wheels.

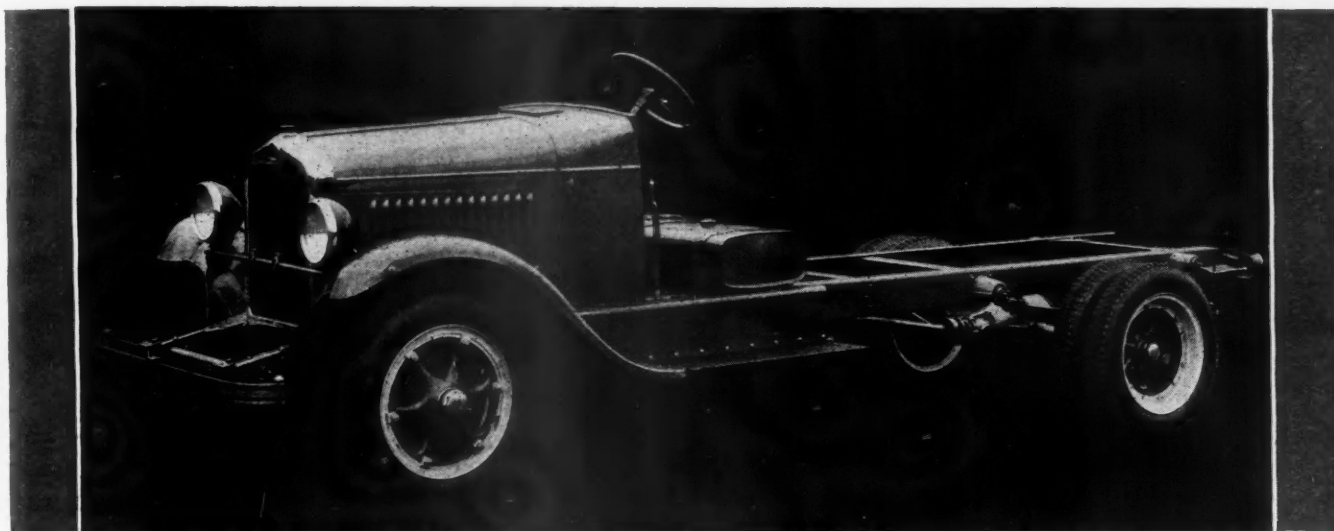
The steel cab is of the enclosed type and it will accommodate three passengers. The spare tire is mounted directly in the rear of the cab to permit installation of snow plows.



April, 1929

WHITE 61 IS ANOTHER SIX

Model 61 Has 8000 to 10,500 Lb. Gross Weight Rating and Unit-Mounted 4-Speed Transmission



ANOTHER six-cylinder, light-duty truck is the latest offering of the White Co., Cleveland, Ohio. This chassis, Model 61, has a gross weight rating of 8000 to 10,500 lb., including chassis, body and load, compared with gross weight rating of 6000 to 8000 lb. for Model 60, announced in January.

Model 61, which is available in two wheelbases, 148 and 170 in., has the same engine as Model 60 and it strongly resembles the latter in appearance. The larger chassis, however, is equipped with a unit-mounted four-speed transmission and is supplied with dual rear tires. Service brakes are Lockheed hydraulic on four wheels and drums are of gun iron.

The clutch, of White design and manufacture, is of the single plate type operating in oil. All rotating parts are balanced with the fly-wheel assembly. Clutch throw-out and clutch shaft bearings are lubricated automatically.

Ball bearings are used throughout the transmission and the speedometer drive is enclosed in the rear of the case. Gears are made of hardened alloy steel.

Friction type controls for throttle and headlights are mounted in the center of the steering wheel and the spark advance on the instrument board. Equipment includes instrument board, speedometer, front fenders, dash and cowl, headlights with dimmer spare tire carrier under rear of frame.

Tire equipment is either 30 by 5 or 32 by 6. In either case single tires are used on front and dual on rear.



New White Model 61 has gross weight rating of 8000 to 10,500 lb. The engine is a 3½ by 4½ six, transmission a four-speed and rear axle bevel gear semi-floating. Dual rear tires are standard equipment

Specifications of White Model 61

Gross weight rating	8000 to 10,500 lbs.
Wheelbase	148, 170 in.
Engine	Own
size	6-3½ x 4½
displacement	260 cu. in.
Carburetor	Zenith
feed	vacuum
Gasoline tank capacity	20 gal.
location	under seat
Ignition	Delco-Remy
control	hand and automatic
Radiator type	cellular
control	thermostat
Clutch make	Own
type	plate
running in	oil
Transmission make	Own
speeds	4
mounted	unit
Rear axle make	Own
type	semi-floating
ratio standard	6.33 to 1
ratio optional	5.18 to 1
	5.67 to 1
	7.12 to 1
Steering gear type	screw and nut
Brakes service	four-wheel hydraulic
Hand brake	driveshaft
Wheels	cast steel
Tires	
front	30 x 5 or 32 x 6
rear	30 x 5 dual or 32 x 6 dual
Frame	6¼ x 3 1/16 x ¼
Width	34½
Back of cab to center of rear axle	
148 in. wheelbase	68½
170 in. wheelbase	90½
Back of cab to end of frame	
148 in. wheelbase	115½
170 in. wheelbase	137½

MODEL 80 COMPLETES LARRABEE LINE

Specifications of Larrabee Model 80

Model	.....80
Wheelbase	.....166, 184, 195, 205*
Engine	.....Continental 21R
Size	.....6-4½ by 4¾ in.
Carburetor	.....Zenith
Clutch	.....Brown-Lipe
Transmission	.....Brown-Lipe
Speeds	.....7
Mounted	.....Amidship
Rear Axle	.....Timken
Type	.....Worm
Steering Gear	.....Ross
Service Brake, front	.....Lockheed hydraulic
Rear	.....Timken Duplex hydraulic
Hand brake	.....Tru-Stop Disk
Wheels	.....cast
Frame	.....8 x 3½ x ¼
Tires	.....36 x 8

*Longer at extra charge.

LARRABEE MODEL 80, which is the largest of the new line of the Larrabee-Deyo Motor Truck Co., Binghamton, N. Y., incorporates interchangeability of units and of parts as described in the January issue. It is powered with a six-cylinder 21R Continental engine, 4¾ by 4¾ in., of overhead valve type. This engine is interchangeable in chassis mounting with the 4¾ by 4¾ in. 20R engine which is standard in Model 70.

Four-wheel hydraulic brakes are employed with vacuum mechanism operating the master cylinder. Front brakes are of Lockheed type while the rear brakes are Timken duplex arranged for hydraulic operation. The hand brake is a double-ventilated disk-type mounted on the driveshaft.

Coupe cabs for this model follow the same design as those used on the other models.

The makers have adopted the gross weight rating plan for all trucks in the new line. Chassis weight includes chassis with gasoline and oil but without the cab. Maximum allowable gross weight includes weight of chassis, cab, body and load. Weights and ratings are given in the accompanying table.

Larrabee Model 80, with total gross weight rating of approximately 23,000 lb., is the largest of the new line of the Larrabee-Deyo Motor Truck Co.



Gross Weight Ratings

Model	Chassis Weight	Weight Cab	Gross Weight Rating
20	3745	425	8170
30C	4125	425	9550
30T	4125	425	10550
30W	4125	425	10550
40	5525	425	13450
50	5605	425	14500
60	6690	450	17140
70	7290	450	20240
80	7800 (A)	450	23000 (A)

(A) Approximate.

HIGHLAND COUPE CAB

THE Highland Coupe cab, designed for the 1929 White 60, while possessing passenger car lines, is constructed to withstand truck service. Maximum driver comfort and pleasing appearance of exterior were considered

Highland coupe cab on the White Model 60

in the design. All exposed parts are of steel and finished to withstand rough usage. A wide door and an additional clearance of eight inches between seat box and front pillar are obtained by elimination of corner glasses at either side of the windshield which characterized former models. The rubber-set, plate-glass windshield is carried in a one-piece heavy steel frame, ventilating out. The front has cadet type sun visor. The cab is 55 in. wide at the rear, but sides taper to the front to fit cowl on chassis. Specifications: Height, 56 in.; width of seat, 50 in.; and door width, 27 in. The Highland Body Mfg. Co., Cincinnati, is the maker.

Beats Railroads

(Continued from page 25)

of 1050 miles, and after being filtered is used on local service vehicles. The chassis have a four-speed transmission and a double-reduction, full-floating rear axle. Goodyear tires, 36 by 6, single in front and dual on rear, are used. Inflation pressure is 35 lb. front and 42 lb. rear; it is checked daily. The tires are kept in service between 13,000 and 15,000 miles, after which they are used up on trucks operating over city routes.

The gas tank on the cowl has a capacity of 27 gal. The closed bodies measure 165 in. x 78 in., with a height of 72 in. Weight empty is 8170 lb., and usually 15,600 lb. fully loaded.



FWD

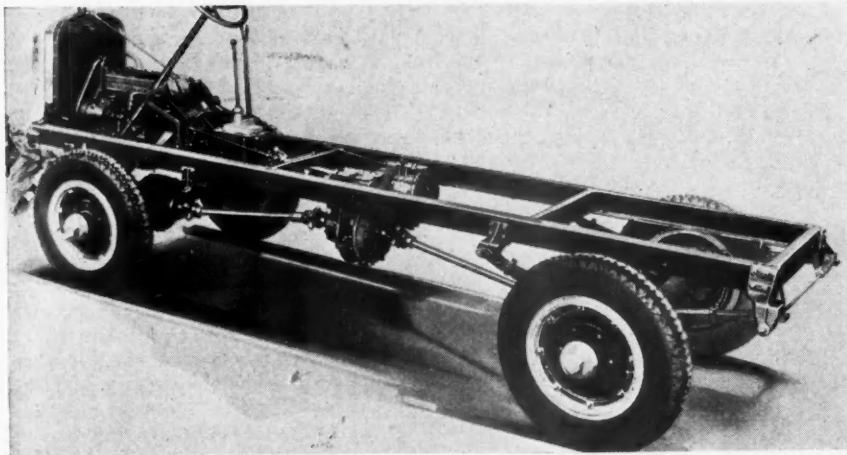
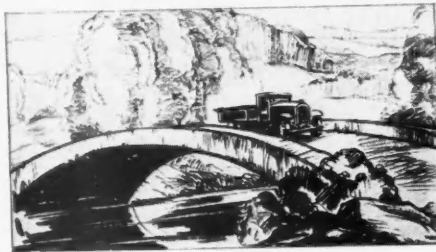
PUTS OUT 2-TON SIX

A NEW six-cylinder four-wheel drive truck of two-ton capacity has been added to the line of the Four-Wheel Drive Auto Co., Clintonville, Wis. The new FWD is a development of the four-cylinder model H and will be designated H-6.

The engine is a Waukesha XL with six-cylinders $3\frac{1}{2}$ by $4\frac{1}{2}$ in. The oil pan of the engine is designed with the oil sump forward to provide clearance for the front axle housing and permit the frame to be mounted low, only 29 in. from the ground.

Following characteristic FWD design model H-6 has a four-speed transmission mounted in unit with the engine, a sub-transmission placed amidship and full floating bevel gear axles, front and rear. The sub-transmission assembly includes two sprockets and

Has Speed Range From
25 to 39 M. P. H. Ac-
cording to Ratio



Chassis of the FWD new six-cylinder two-ton four-wheel drive truck. The frame is only 29 in. from the ground

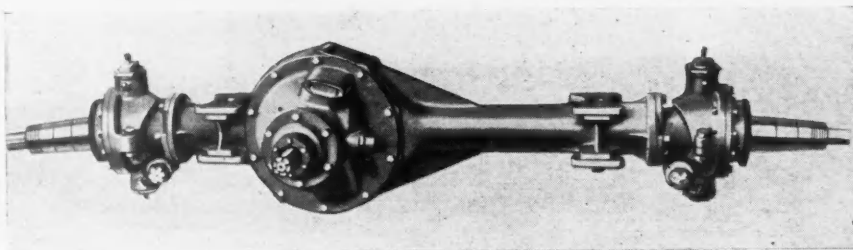
chain and a differential. Four different gear reductions can be obtained by changing sprockets. The resulting ratios in high are 5.76, 6.52, 7.88 and 8.92 to 1.

A single brake drum with 252 sq. in. of braking surface is used as a service brake. This brake is mounted on the upper shaft of the sub-transmission and exerts its braking action on all four wheels of the truck. The hand brake operates on 18 x 3 in. drums on rear wheels.

The Commercial Car Journal
and Operation & Maintenance

Specifications FWD H-6

Model	H-6
Capacity	2-ton
Body weight allowance	1000 lb.
Price chassis	\$3,425
Wheelbase, standard	133 in.
optional	145, 160 in.
Weight chassis	5500 lb.
Engine make	Waukesha XL
size	6- $3\frac{1}{2}$ x $4\frac{1}{2}$
displacement	260 cu. in.
hp.	58
Carburetor make	Zenith
feed	vacuum
Gasoline tank location	under seat
capacity	20 gal.
Ignition make	North East
Generator and starter	North East
Radiator	tubular
capacity	8 gal.
fan	18 in.
drive	V-belt
Governor	Built-in
Clutch	Brown-Lipe
type	disk
Transmission	Brown-Lipe 51
speeds	4
mounted	Unit
Sub-transmission	
mounted	amidship
type drive	chain and sprocket
ratio	4 optional
Drive	4-wheel
Universal joints	Blood Brothers
number	4
Rear axle	Own
type	bevel full floating
ratio	6.52
Front axle	Own
type	bevel full floating
ratio	6.52
Drive and torque	springs
Steering gear make	Ross
Service brake	transmission
size drum	11 $\frac{1}{2}$ x 7
braking action	four wheels
Hand brake	rear wheels
type	expanding
size	18 x 3
Springs, front	42 $\frac{3}{4}$ x 2 $\frac{1}{2}$
number of leaves	10
rear	52 $\frac{3}{4}$ x 2 $\frac{1}{2}$
number of leaves	14
Frame	5 $\frac{3}{16}$ x 2 $\frac{1}{4}$ x 9/32
Tires, standard front	34 x 7
standard rear	34 x 7
Cab to rear of frame	118 in.
Cab to rear axle	87 in.
Overall length of frame	212 in.
Chassis lubrication	Alemite



Front axle of FWD model H-6. Steering knuckles consist of a ball and socket. The ball, which is secured to axle housing, has heavy pivots at top and bottom. A cast steel socket is fitted over the ball. Pivots and sockets are provided with hardened bushings and buttons riding in adjustable plugs. Front axle shafts are the same as in a conventional full floating axle except that at the steering pivot they have universal joints within the ball and socket

April, 1929

FORD DISK WHEEL

Ventilated Assembly Includes Integral Tire Rim and Detachable Ring

A DEMOUNTABLE wheel of the ventilated disk type is now in production on the Ford AA 1½-ton truck. The wheel assembly includes an integral tire rim with a quick-detachable side locking ring. The disks have six holes near the outer edge which give the appearance of wide, flat spokes to the intervening sections.

Wheels are attached to hubs by means of rust-proof acorn nuts and when in place the wheel locks the hub cap.

The new wheels are interchangeable

in mounting on hubs with the steel spoke wheels which were originally supplied.

Generators which resemble the Ford Model T type are coming through on Model A powerplants. Compared with

the powerplant type generator which has been embodied in the Model A, the new generator is longer and of less diameter. It is mounted in the same position as the powerhouse generator and is driven by the fan belt.



Ventilated disk wheels are used on the Ford Model AA truck. The steel express body shown measures 84 in. length, 48 in. width and 12½ in. from floor to top of sides. Sockets are provided for stakes, racks or sideboards. The end gate is of steel. The cab will accommodate a driver and two helpers

MACK TRAILERS

(Continued from page 35)

are offered, including 7-gage steel sideboards having three-inch top flanges; thin edge but reinforced division boards

operated by a long lever; extension brackets and hinges for converting the standard double-acting tail-gate and posts into the high hung type, 6 or 12 inches higher; rounded steel plates curved on 3-inch radius for welding into body corners; rope guards to prevent steam shovel control ropes from catching onto tail-gate posts; and a scuttle tail-gate, similar in construction to the double-acting gate. The scuttle gate opening is variable, according to requirements.

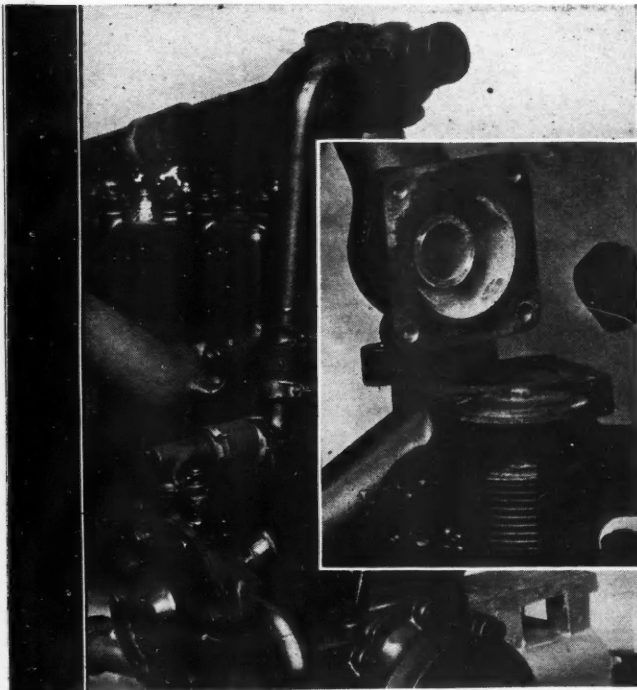
Model AB chain-drive trucks are now being made with brake connections reversed from previous arrangement, the pedal operating rear wheel brakes instead of a drive-shaft brake located on the bevel

pinion shaft of the jackshaft assembly as formerly. This brake hookup is now the same as that on Mack shaft-drive trucks which have always had the foot brake operating on rear wheels.

A ratchet control of brake pedal which can be thrown into action by a hand-operated latch is incorporated in the chain drive brake arrangement. In ordinary operation of the truck the ratchet is not used, but if for any reason, such as failure of the hand brake, the driver wishes to lock the service brake, he can do so by turning the latch.

The system of thermostatic control of engine cooling water temperature now used on Mack bus, truck and fire apparatus engines is of the cold circulation type in which closing of the thermostat shuts off the circulation within the cylinder jackets and by-passes the water pump discharge directly back into the radiator. This design obviates back pressure on the pump.

The thermostatic element is a Sylphon-bellows installed in the cylinder head water outlet where it controls a flat poppet valve which floats between a port opening into the cylinder head riser and another communicating with a bypass tube leading to the water pump outlet. Passage to the upper tank of the radiator is open at all times. When the engine starts cold the valve closes the cylinder outlet and permits water from the pump to pass directly to the top tank of the radiator. As the engine warms up the valve allows some water to circulate through the jacket, the balance being by-passed. At maximum temperatures the bellows expand, closing by-pass and directing all water through the engine.



Cold circulation type thermostatic control of cooling water on Mack engines. Water from the pump is by-passed through vertical pipe until engine is warm. Sylphon-bellows and valve which directs pump discharge to radiator or jackets, or in proportion to both

HUG ENGINE OVERHANGS THE FRONT AXLE

Same Weight Carried on Each Wheel of Road- building Models 87 and 96



PRESENTATION of two new Roadbuilder chassis on wheelbases of 117 and 133 in., equipped with power hoist bodies, is announced by the Hug Co., Highland, Ill. Designated as Models 87 and 96 and rated at $3\frac{1}{2}$ and 5 tons, respectively, these new products are essentially the same in construction, differing only in size of rear axle, springs, brake drums, frame, wheels and tires.

One of the particular features of interest in these models is the design employed to obtain equally balanced load distribution over all four wheels and large carrying capacity with short wheelbase. This is accomplished by locating the front axle back of the engine. As a result of this construction the steering gear housing is forward of the front axle and the drag link extends to the rear from the steering arm, instead of to the front, as in conventional design.

The Hug multi-cushion rear spring assembly is incorporated in both models. This suspension consists of two springs, the lower side forming a semi-elliptic spring, shackled at the rear and bracketed at the front, while the upper side is mounted solid in front and rides in a special casting on the axle in the rear. The same bracket provides front-end connections for both springs and the same axle casting serves as a seat for both. The upper spring

functions as a "helper" spring to assume a portion of the load when the truck is full and as a rebound spring under light loads. The lower spring carries most of the load.

An additional feature of the Roadbuilders is the front bumper. It consists of a channel with flanges to the front, plate-riveted to the side rails of the frame which are extended several inches beyond the radiator.

Specifications Hug 87 and 96

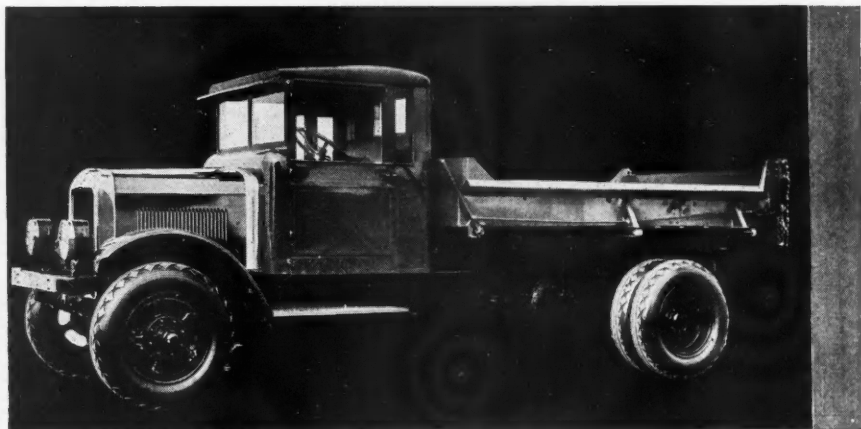
Model	87	96
Capacity	$3\frac{1}{2}$ tons	5 tons
Wheelbase, standard ..	117"	133"
Weight, chassis	6550 lb.	7390 lb.
Engine make	Buda DW6	Buda DW6
size	$6-3\frac{1}{4} \times 5"$	$6-3\frac{1}{4} \times 5"$
hp. at 2200 r.p.m. .	70	70
Carburetor, make ...	Zenith	Zenith
feed	vacuum	vacuum
Gasoline tank, location	under seat	under seat
capacity	20 gal.	20 gal.
Magneto make	Eisemann	Eisemann
Generator and		
starter	Delco-Remy	Delco-Remy
Radiator	Young	Young
type	tubular	tubular
circulation	pump	pump
Clutch, make	Brown-Lipe	Brown-Lipe
type	disk	disk
Transmission, make ..	Brown-Lipe 51	Brown-Lipe 51
speeds	5	5
mounted	unit	unit
Universals, make	Blood Brothers	Blood Brothers
number	2	2
Rear axle make	Wisconsin 8800B	Wisconsin 1225K
type	full-floating	full-floating
	double reduction	double reduction
ratio standard	7.85:1	8.9:1
Drive and torque	Springs	Springs
Steering gear, make...	Ross	Ross
Service brake location	rear axle	rear axle
type	internal	internal
drum size	18 x 4 in.	18 x 4 in.
Hand Brake:		
location	rear axle	rear axle
type	internal	internal
drum size	$13\frac{1}{2} \times 2\frac{1}{2}$ in.	$13\frac{1}{2} \times 2\frac{1}{2}$ in.
Springs:		
front	$2\frac{1}{2}" \times 41\frac{1}{4}"$	$2\frac{1}{2}" \times 41\frac{1}{4}"$
rear	$3" \times 54\frac{1}{4}"$	$3\frac{1}{2}" \times 54\frac{1}{4}"$
auxiliary	$3" \times 28\frac{1}{2}"$	$3\frac{1}{2}" \times 28\frac{1}{2}"$
Wheels, make	Motor Wheel	Van
type	spoke steel	
Tires, standard	$38 \times 7"$	$36 \times 8"$
Frame	6" I-beam	7" I-beam
Overall length		
of chassis	203"	217"
Overall length of		
frame	203"	217"
Length, cab to center		
of rear axle	64 $\frac{1}{2}$	57 $\frac{1}{4}$
Length, cab to end		
of frame	96 $\frac{3}{4}$	112 $\frac{3}{4}$
Turning radius	22 ft.	31 ft.



Hug Model 96, 5-ton Road-builder. Note front axle location and bumper construction. The $3\frac{1}{2}$ -ton Model 87 follows similar lines

MORELAND PRESENTS ACE AND CALIFORNIAN

Chassis Capacity of
Light Model 3800 Lb.,
and of Heavy Duty
Model, 14,000 Lb.



THE Californian, a new model Moreland truck, was specifically designed to carry the largest pay-load permissible under the California gross weight limit for four-wheel trucks of 22,000 lb. The new chassis weighs 8000 lb. and has a rated chassis carrying capacity of 14,000 lb. In dump service, with a body and hoist weighing 2000 lb., this unit has, therefore, a pay-load capacity of 12,000 lb. To keep chassis weight down and at the same time provide strength for carrying the load Moreland engineers made large use of alloy steels and omitted all unnecessary parts.

Chassis units comprise Hercules WXC six-cylinder,

The Moreland Californian chassis weighs 8000 lb. and has a carrying capacity of 14,000 lb. An all-steel cab and front-wheel brakes are offered at extra cost

Specifications of Moreland Californian and Ace

Model	Californian	Ace
Chassis capacity	14,000 lb.	3800 lb.
Price	\$4,990	\$1,275
Wheelbase	156, 168, 180 & 192 in.	134 in.
Weight	8000 lb.	3000 lb.
Engine, make	Hercules YXC	Continental 34L
size	6-4 $\frac{1}{2}$ x4 $\frac{3}{4}$	6-2 $\frac{3}{8}$ x $\frac{3}{4}$
Carburetor make	Zenith	Zenith
feed	pump	vacuum
Gasoline tank location	under seat	under seat
Ignition, make	Auto-Lite	Auto-Lite
Generator and Starter	Auto-Lite	Auto-Lite
Radiator	Long	Long
Clutch	own disk	Brown-Lipe plate
Transmission	Brown-Lipe 55	Brown-Lipe-20
speeds	7	4
mounted	amidship	unit
Universals, make	Cleveland	Cleveland
number	4	3
Rear Axle, make	Timken 66702W	Timken 52000H
type	worm full-floating	bevel full-floating
drive	radius rods	springs
torque	springs	springs
Steering Gear	Ross	Ross
Service Brake	Internal 4-wheel	Hydraulic 4-wheel
Hand Brake	Internal 2-wheel*	External
location	Internal worm shaft	driveshaft
Springs		
front	44x3 in.	38x2 $\frac{1}{4}$ in.
rear	56x3 $\frac{1}{2}$ in.	48x2 $\frac{1}{2}$ in.
auxiliary	yes	no
Frame	9 1/16 x 3 5/16 in. x 9/32 in.	5 1/2 x 1-7/8 x 3/16 in.
Tires		
front	36x6 solid	32x6.75
rear	36x12 solid or 36x6 dual	32x6.75
Length, dash to end of frame	164, 194, 206, 218 in.	154 in.

* Front wheel brakes optional at extra charge.

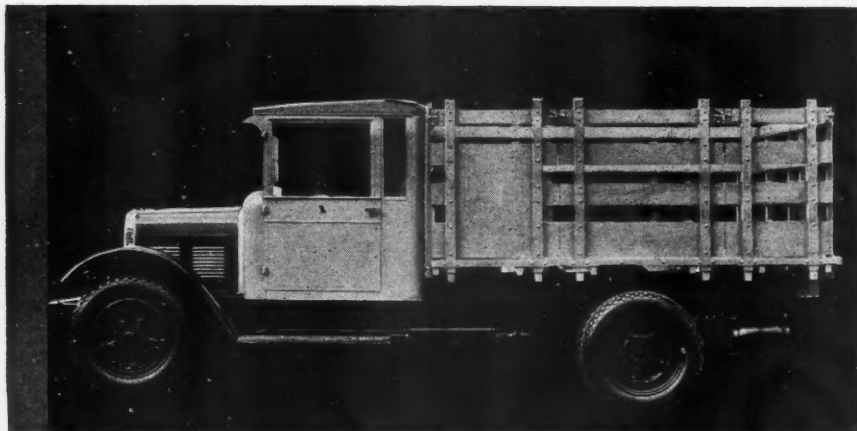
The new Ace Moreland is a speedy unit with chassis capacity of 3800 lb.

4 $\frac{3}{8}$ by 4 $\frac{3}{4}$ in. engine; Brown-Lipe seven-speed transmission, mounted amidship, and Timken worm-drive rear axle.

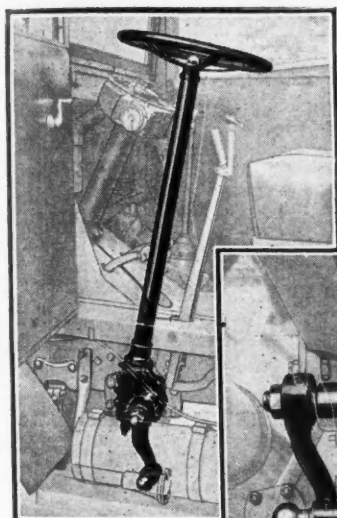
Two-wheel brakes are standard equipment but front wheel brakes are available at extra cost. Service brakes are of internal type operating on rear wheel drums. Hand brake also is internal, operating on a drum mounted on the rear axle at the forward end of the worm shaft. A vacuum booster is incorporated in the service brake hook-up for either two or four-wheel brakes.

A new light truck, which has been designated the "Ace," is another addition to the line of the Moreland Motors Truck Co., Los Angeles, Cal.

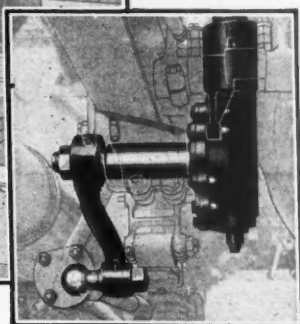
This unit also is rated on basis of chassis capacity, rather than tonnage. Maximum gross weight is 6800 lb., chassis weight 3000 lb. and carrying capacity 3800 lb.



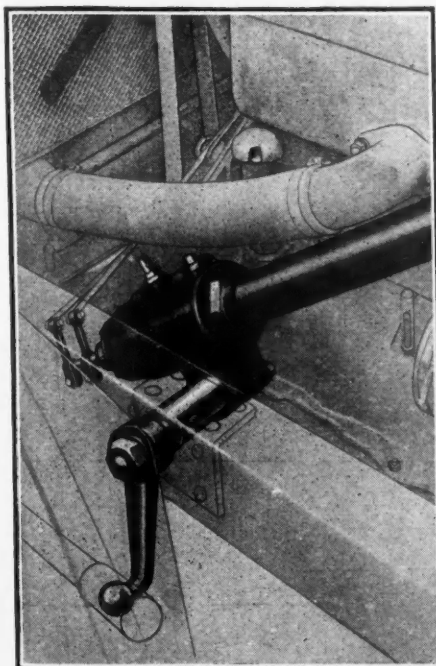
These Pictures Show the Simplicity of Replacing Worn Truck and Bus Steering Gears with Ross



Ross Cam and Lever Steering Gear installed as replacement unit in Packard Truck.

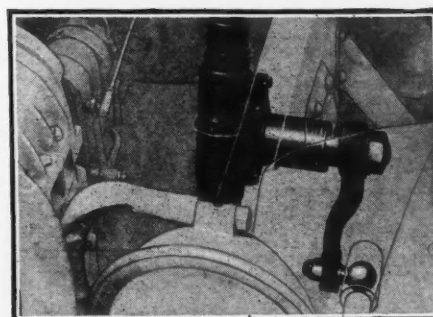


Another view of Ross Gear installed in Packard, showing clean-cut installation.



Stewart Truck with Ross Cam and Lever Steering Gear installed as replacement. Note simplicity of installation.

Ross Cam and Lever Steering Gear installed as replacement in G. M. C. Truck. Another example of the neat and simple installations possible with Ross.



IT IS an accepted fact that Ross Cam and Lever Steering Gears provide easier steering and greater control and safety for trucks and buses, just as they do for passenger cars. In fact, 75% of all truck and bus models now have Ross Steering as original equipment.

The photographs on this page show how simple it is to install Ross Cam and Lever Steering Gears as replacements for the old, worn gears of trucks and buses that are not originally Ross-equipped. You have no experimental work to do when you install the Ross. Simply put down the measurements of the old gear on a form which we will supply, and your order can be filled with complete accuracy.

In equipping with Ross Cam and Lever Steering Gears for replacement you are assured easier steering, freedom from road-shock and far lower maintenance costs. Adjustment is unnecessary over long periods of service. Your trucks or buses will get through traffic with greater speed and safety, making possible better schedules and more efficient all-round operation.

Write for the illustrated Ross folder on truck and bus installations. It shows how to order a Ross steering gear for any truck or bus.

Ross Gear & Tool Company • Lafayette, Indiana

ROSS Cam AND Lever STEERING

GRAMM HAS DOUBLE-DROP FRAMES ON VANS



Specifications of Grammm Vans

Model	Senior	Junior
Chassis Capacity ..	18-20-ft. body 1000 cu. ft. 13,000 lb.	16 ft. body 800 cu. ft. 9000 lb.
Wheelbase, standard	236 in.	210 in.
optional	210 in.	190 in.
Weight chassis	9400 lb.	6800 lb.
Engine, size	Continental 6-4 1/4 x 5 1/4	Continental 6-4 1/4 x 4 1/4
displacement	611 cu. in.	428 cu. in.
hp.	128	105
Carburetor, make	Zenith	Zenith
feed	vacuum	vacuum
Gasoline tank, location	rear of frame	rear of frame
capacity	45 gal.	45 gal.
Ignition type	twin	twin
Generator make	DeJon	DeJon
Starter make	Autolite	Autolite
Radiator, make	Perfex	Perfex
type	tubular	tubular
Clutch make	Fuller	Fuller
type	disk	disk
Transmission, make	Fuller	Fuller
Speed	4	4
mounted	unit	unit
Universals, number	4	4
make	Blood Bros.	Blood Bros.
Rear Axle type	Wisconsin double reduction full floating	Wisconsin double reduction full floating
ratio standard	4 to 1	4.3 to 1
ratio optional	4.7 to 1 5.4 to 1 5.74 to 1	4.89 to 1 5.33 to 1
Drive and torque	springs	springs
Steering Gear, make	Ross	Ross
type	cam and lever	cam and lever
Service Brake	4-wheel operation	4-wheel operation
auxiliary	mechanical vacuum	mechanical vacuum
size front	17x3 in.	17x3 in.
size rear	17x5 in.	17x5 in.
Hand Brake	2-wheel	2-wheel
size	12 1/2 x 2 1/2	12 1/2 x 2 1/2
Springs	progressive	progressive
front	44x3	44x2 1/2
rear	60x4	60x3
Tires, standard front	36x8	34x7
rear	36x8 dual	34x7 dual
Frame	8 1/2 x 3 1/4 x 1/4	8 1/2 x 3 1/4 x 1/4
width, front	34 1/2	34 1/2
rear	41 1/2	41 1/2
height, loaded	24 in.	22 in.
Overall length of chassis	326	296
Length, dash to end of rear axle	193 1/4	171
Length, dash to end of frame	250 1/4	228

* Thickness 3/16 on 190 in. wheelbase.



Chassis of Grammm Imperial Senior Van. A tubular stabilizer is fastened across the chassis under the front fenders. Double front bumper construction, kick-up in frame, X-brace and battery mounting are features of interest

Junior chassis with van body. Cab doors are at an angle with side panels

Height of X-Braced and Lined Frames of Imperial Senior and Imperial Junior Models, 24 and 22 in.

CARRYING the titles of "Imperial Senior" and "Imperial Junior," two vans introduced by Grammm Motors, Inc., Lima, Ohio, incorporate six-cylinder twin ignition engines, four-speed transmissions, three-piece propeller shafts, four-wheel brakes and double reduction rear axles with fast ratios.

The Senior chassis which has a standard wheelbase of 236 in. is designed for an 18 ft., 1000 cu. ft. body, while the Junior model accommodates a 16 ft. body of 800 cu. ft. capacity on a wheelbase of 210 in.

Frames are of the double kick-up type with frame liners and are equipped with a large X brace at the center with seven channels and one tubular cross member. A tubular stabilizer extends across the chassis from rear of front fenders.

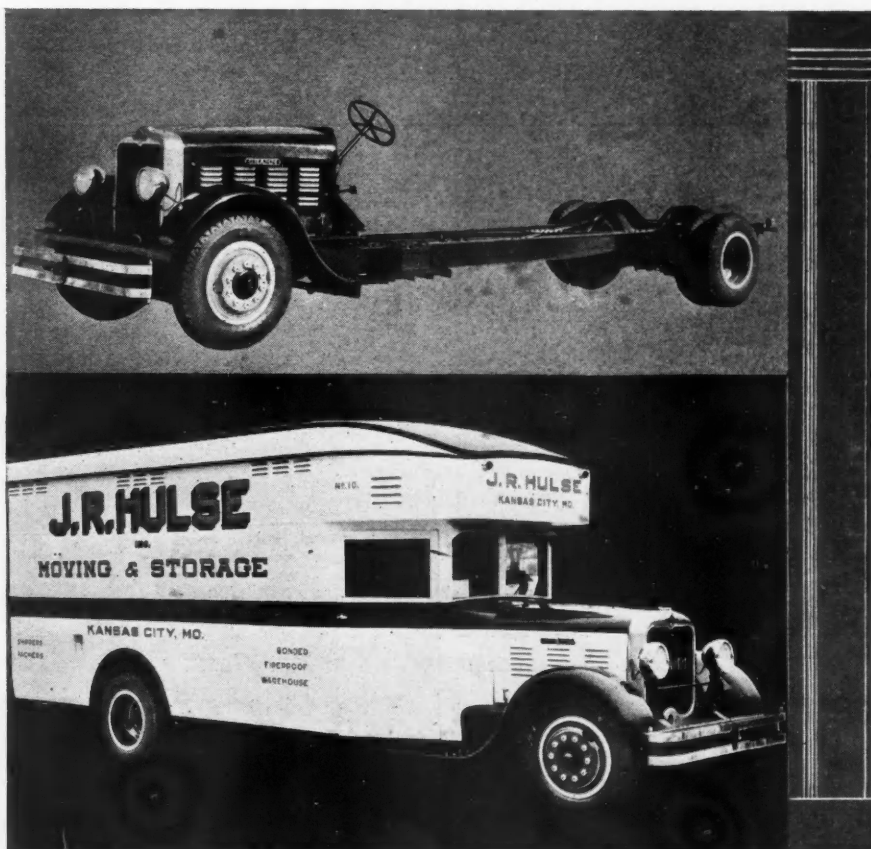
Two separate braking systems are

employed, the service brakes operating on four wheels and the hand brakes on separate drums on rear wheels only. Rear drums are of cast Gunnite and front drums of high carbon pressed steel. Pedal effort is supplemented by vacuum booster.

Maximum governed speed of the Senior van is 50 m.p.h., with 36 x 8 tires; of the Junior, 53 m.p.h., with 34 x 7 in. tires.

Progressive type semi-elliptic springs are employed, front and rear. There are two complete springs, one above the other, the lower functioning only under heavy loads. Front springs are shackled at front, rather than rear.

The new vans will be sold direct from the factory, according to statement of the company. It was said further that a new line of trucks of advanced design would be announced soon.



THE NEW STEWARTS



1 Ton
6 cylinder
4 wheel Brakes
\$995
Chassis

*are 5 to
10 year
trucks*

STEWARTS are famous for their ability to stay on the job many years. Stewart owners do not figure depreciation on a one or two year basis; they know by experience that the average life of a Stewart is five years or more. Many Stewarts have given their owners 8, 10, and even 12 years of reliable service.

The new Stewarts embody improvements which mean lower operating costs and greater freedom from unnecessary repair bills. Ability to stay on the road and out of the repair shop has long been one of many Stewart features which has earned them the title "America's Greatest Truck Value"

Ask the Stewart owners in your community the results they are getting. Find out the opinion of truck experts. They are placing Stewart at the top of all truckdom.

Stewart Sales Are Increasing

Stewart sales in 1926 were 41% greater than in 1925 and in 1927, 45.7% over 1926. Sales in 1928 were 53% ahead of 1927. Learn why!

Catalogs gladly sent upon request.

STEWART MOTOR CORPORATION
BUFFALO, N. Y.

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Models

¾ Ton	
6 Cylinder . . .	\$895 Chassis
1 Ton	
6 Cylinder . . .	\$995 Chassis
1¼ Ton	
4 or 6 Cylinder . . .	\$1295 Chassis
1½ Ton	
4 or 6 Cylinder . . .	\$1645 Chassis
2 Ton	
4 or 6 Cylinder . . .	\$1975 Chassis
Worm Axle . . .	\$2095 Chassis
2½ Ton	
6 Cylinder . . .	\$2690 Chassis
3 Ton	
6 Cylinder . . .	\$3490 Chassis
4 Ton	
6 Cylinder . . .	\$4200 Chassis

All prices f.o.b. Buffalo

Stewart

MOTOR TRUCKS



2½ Ton
6 cylinder
4 wheel Brakes
\$2690
Chassis

Stewart Trucks Have Won By Costing Less to Run

FOUR AIDS FOR AXLE REPAIR

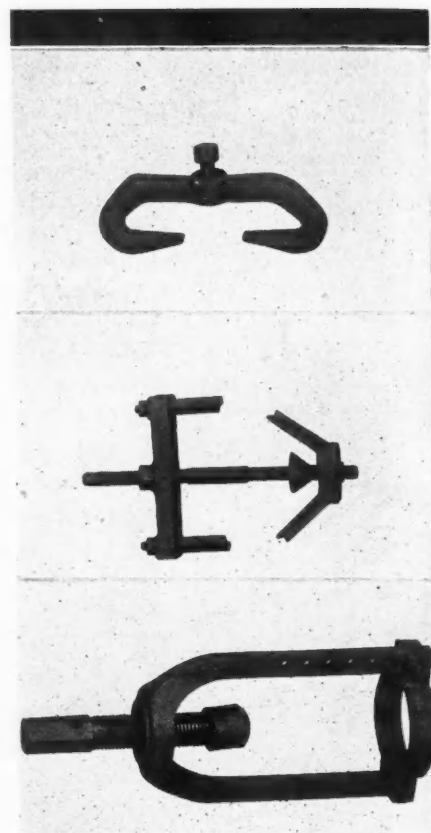
Timken-Detroit Axle Co. Develops Tools for Removing Parts



FOUR service tools for removing axle housing sleeves, bearing cups and cones and universal joint flanges of all sizes of Timken axles have been developed by Timken-Detroit Axle Co., Detroit, Mich. The tools are manufactured by National Tool Co., Jackson, Mich., and may be purchased from that company or the Timken company.

The four tools are: housing sleeve puller, universal joint companion flange puller, hub bearing cup puller and axle shaft cone puller. The housing sleeve puller set consists of a bar, with four notches, four dogs of different outside diameters, two sleeve adapters and a nut and handle. The companion flange puller is not adjustable. The hub bearing cup puller has two adjustments, while the shaft bearing puller has a series of holes providing set-up for different shafts.

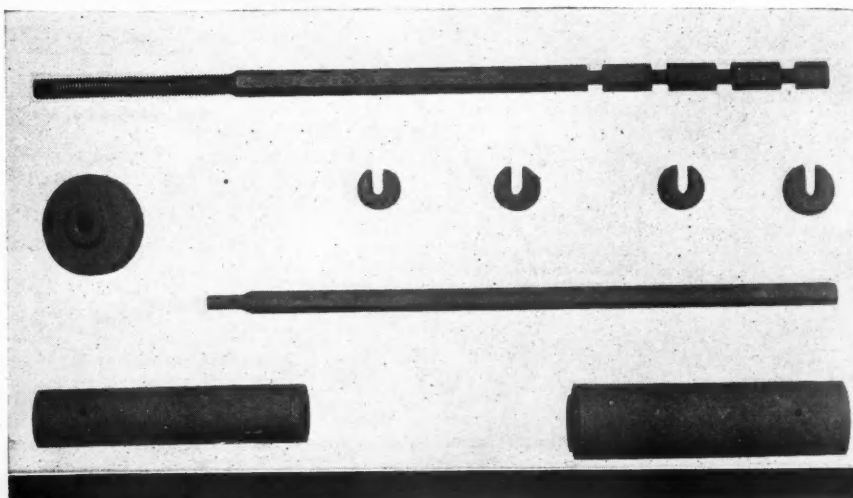
Method of using each tool is shown in the accompanying illustrations.



Upper: Companion flange puller is adaptable to any size flange. Price \$7.40

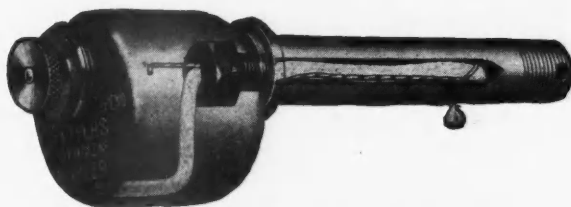
Center: Hub bearing cup puller is adjustable to fit any size cup. After the arms have been adjusted force is applied by puller screw. Price \$15

Lower: Axle shaft cone puller will fit any size axle shaft cone. Three different size yokes are furnished. Price \$53



Left: Axle housing sleeve puller. To remove sleeve from any housing wherein the sleeve is pressed through the brake spider first remove the wheels and driving unit. Next insert puller bar in sleeve then place puller bar dog in proper groove. Place sleeve adapter over end of screw, screw puller bar nut and apply force with wrench. The outfit including two sleeve adapters and four dogs with bar and wrench is priced \$53.70

The Standard Oil Co. (Indiana) Has Just Issued a Blanket Order that All Trucks Purchased, Regardless of Make Must Be Equipped With **Myers** MAGAZINE OILING **System**



"Lubrication for the various chassis bearings to be furnished by the Myers Magazine Oiling System, providing for wick feed of oil to these bearings. The oilers for the spring-shackles and other bracketed bearings are to be incorporated in the shackles and brackets. All oilers, whether integral or attached, are to be equipped with Myers ball-valve caps for pressure filling."

[Taken from Standard Oil Co. (Ind.) latest purchase specifications]

The Standard Oil Co. (Indiana), is the most recent fleet owner to install the Myers Magazine Oiling System at its own expense. The fleet superintendents are ripping off the grease fittings and putting on Myers Oilers. They didn't make this move for fun. They didn't do it on a hunch. They are cashing-in on FACTS—facts they dug up for themselves during tests covering the last 2½ years.

By these tests they discovered that a shackle-bolt or a king-pin, or a clutch release—or any other chassis bearing—lasts at least twice as long when lubricated by the Myers System. No one talked them into this conclusion. They found it out by checking their repair bills.

Operators of bus or truck fleets can secure the Myers System on new purchases by including in their inquiries and specifications a paragraph similar to the above. This is being done by such concerns as Cleveland Railway Co., Detroit Street Railways, American Railway Express Co., and Detroit Edison.

Some of the biggest truck concerns in the country are now being awarded contracts under the above specifications and are today rushing their design changes to effect early deliveries. They are paid a substantial extra price for the Myers System, which can easily become a part of any truck or bus chassis—and is not only a *big* sales feature, but a *profitable* one for the marketing organization.

Today users of over 60,000 Reo, Fageol, Lange, and Ward LaFrance trucks and buses are ardent advocates of the Myers System. It works constantly and automatically to keep these vehicles out of the shop.

CHASSIS LUBRICATING COMPANY

Rahway, N. J.
(Home Office)

Detroit, Mich.
Capitol Building
(Gould Allen)

NEW PRODUCTS FOR THE TRUCK MARKET

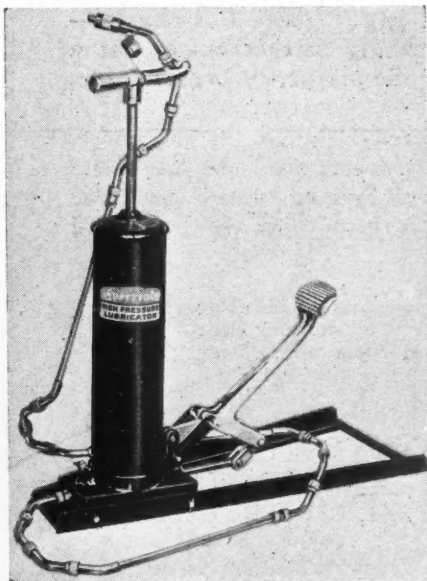


Dayton Steel Wheels

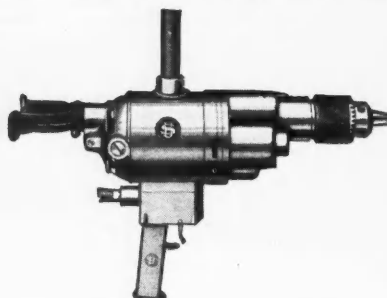
The Dayton Steel Foundry Co., Dayton, Ohio, is furnishing wheels and service for operators desiring to change from solid tire to dual pneumatic tires with practically no change in gear ratio or change in platform height. Dayton steel wheels are cast in one piece from electric furnace steel, with integral hub, spokes and felloe. They have demountable rims.

High Pressure Lubricator

This portable lubricator, made by the Rogers Products Co., Inc., Jersey City, N. J., is made of malleable iron, has no valves and only two working parts, the pedal and piston. Spring or air-pressure is used to force the grease to the base cylinder, from which the lubricant is forced at pressures ranging up to 12,000 lb. Air is used for feeding heavy greases. Fifty strokes delivers 1 lb. of grease. It is known as the Everready Model C-30, weighs 32 lb. and lists at \$54.75.



April, 1929



U. S. 3/4-in. Drill

This new portable electrical drill made by the United States Electrical Tool Co., Cincinnati, is powered by a 60-cycle universal motor, which drives the drill at 250 r.p.m., load speeds. In other respects it is typical of U.S. drills. Weight, 27 lb.; price, \$78.

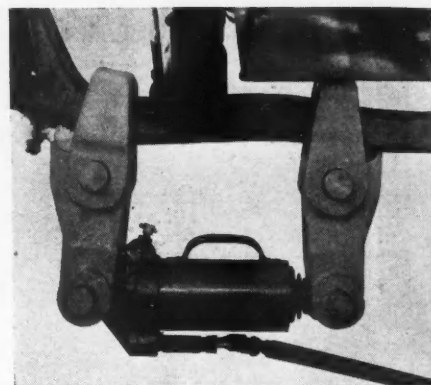
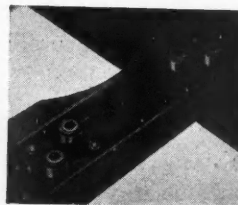
Fuel Consumption Meter



Made by the Sangamo Electric Co. and distributed by the Economy Electric Devices Co., Chicago, this meter measures and registers engine fuel consumption of motor vehicles. The register consists of a cyclometer-type dial reading directly in gallons and tenths of gallons up to 10,000 gal.

Rubber Metal Bushings

Rubber bushings with the rubber bonded to metal inner and outer bushings are being made by the Lord Manufacturing Co., Erie, Pa., for engine suspensions, spring shackles, gear shift lever mounts, body and instrument mountings, etc. For engine mountings, the bushing units are inserted with a press fit into a bracket bolted to frame channel or cross-member, with engine bolts passing through the inner metal shell. The rubber projecting above the outer bushing is under tension and provides snubbing action for shocks.



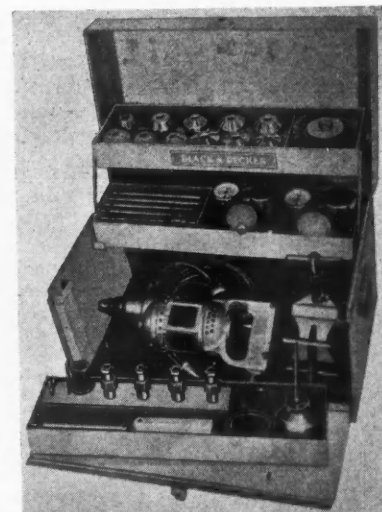
Axle Setter

A hydraulic jack and two heavy arms and clips comprise this unit for bending or straightening axles. The hydraulic unit is operated between the arms for reducing camber and is placed outside one arm and connected to the other by a link for increasing camber.

Two sizes are offered: No. 60 listing at \$150 and No. 90 listing at \$200. The hydraulic unit which fits either setter costs \$35. Manufactured by A. E. Feragen, Inc., and distributed by the Motor Wheel Corporation, Lansing, Mich.

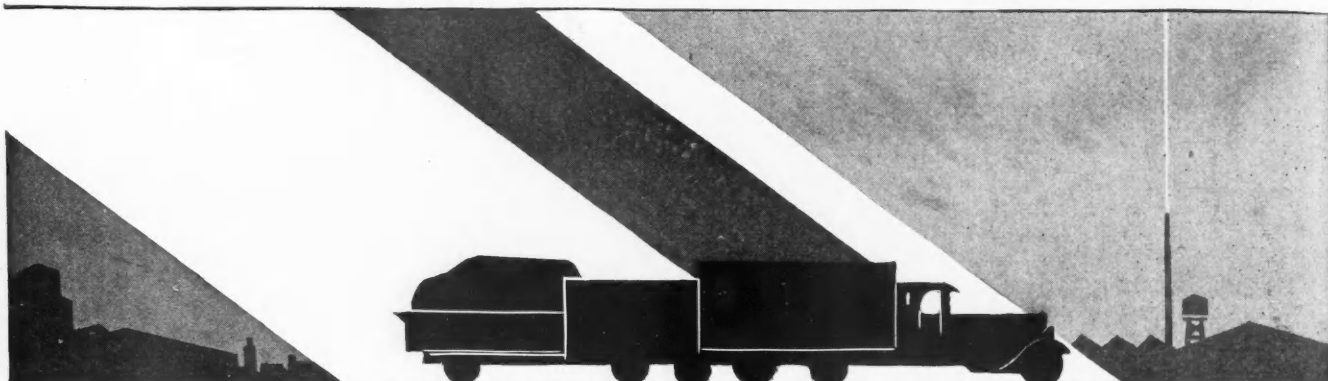
Engine Kit

Brought out by the Black & Decker Mfg. Co., Towson, Md., this metal chest contains a 3/4-in. electric drill complete with valves and carbon tools, equipment to cut and finish seats, two sizes of compressed valve testers and wire brushes.



The Commercial Car Journal
and Operation & Maintenance

TRUCK INDUSTRY



N = E = W = S

Truck Production Up 65 to 70 Per Cent

With March figures still unavailable indications are that truck output for the first quarter of 1929 will show a gain of between 65 and 70 per cent over the corresponding period last year. The increase for the first two months, based on figures compiled by the Department of Commerce, however, shows an increase of over 87 per cent over the same two months of 1928. United States and Canadian production for January and February, 1929, was 55,941 and 61,296 units, respectively, against 27,840 and 34,834 units in 1928.

Brown Heads Johns-Manville

At a meeting of the board of directors of the Johns-Manville Corp., L. H. Brown was elected president to fill the vacancy caused by the death of Theodore F. Merseles. William R. Seigle was elected chairman of the board, succeeding H. E. Manville, who resigned to become chairman of the executive committee. Mr. Brown previous to his election was assistant to the president and secretary.

White Announces Promotions

The White Co. announces the following promotions: J. H. Webb-Peploe, manager of the Newark district; J. E. Hamlett, manager at Baltimore, and A. R. Pape, manager of Washington branch. E. G. Langhorne, former Newark manager asked to be relieved on account of health.

Reo Appoints Jackson

Oscar Jackson has been appointed advertising manager of the Reo Motor Car Co., succeeding Henry T. DeHart, who has resigned.

Rockwell in Charge of Wisconsin

Following the recent consolidation of Wisconsin Parts Co. with the Timken-

Detroit Co., as subsidiary, the Wisconsin Axle Co. has been organized to continue operations at Oshkosh. Operations will be in charge of Walter F. Rockwell, vice-president and general manager; Geo. T. Moore, vice-president and sales manager; A. H. Chatley, secretary-treasurer, and B. W. Keese, chief engineer. Production of the Wisconsin line will be continued.

Mark Truck-Shipped Livestock

LIVESTOCK shipped by motor truck should be appropriately marked and invoiced to facilitate identification and ownership upon delivery, the U. S. Department of Agriculture states. According to stockyard supervisors it is not uncommon for trucks to arrive at the yards carrying animals of two or more owners, without identification of ownership. To avoid error the Department suggests that the animals be marked and reference to the marks made in the invoices.

Brake Lining Data Book

The Asbestos Brake Lining Association announces that the new 1929 data book covering sizes of brake linings and clutch facings will be issued this month. The kind of braking system used will also be listed.

Reo Profits Gain

Reo Motor Car Co. reports net profit for 1928 after all charges as \$5,083,588, which compares with earnings for the previous year of \$4,734,331.

Republic Motor Truck Elects Hanks President

At a meeting of the board of directors of the Republic Motor Truck Co., Inc., G. R. Hanks, president of the Linn Mfg. Corp., tractor manufacturing division of Republic, was elected president of Republic, a post made vacant by the death of O. W. Hayes. T. M. House, formerly Pacific Coast manager for Republic, was made vice-president in full charge of the Alma plant. Joseph A. Bower, of the New York Trust Co., was elected chairman of the board of directors.

Noblitt-Borg-Warner Merger

Officials of Noblitt Spark Industries, Inc., verified the report that their stockholders would meet within a few weeks to vote on a merger with the Borg-Warner Corp. The Borg-Warner Corp., manufacturers of gears and equipment, it will be remembered acquired the Wheeler Schebler Carburetor Co. about a year ago.

Big Year for Parts Makers

"While 1928 was the biggest year in the history of the replacement parts industry, present business volume indicates that 1929 will exceed last year's record breaking pace 25 per cent, according to E. P. Chalfant, executive vice-president of the National Standard Parts Association.

New Studebaker Representatives

T. E. Conner and C. H. Miller have been appointed division commercial car representatives of the Studebaker Corp. of America, with headquarters in St. Louis and Philadelphia, respectively.

Goodrich Net, \$3,513,023

B. F. Goodrich Co. reports net profit for 1928 after all charges as \$3,513,023, which compares with \$11,780,306 at the close of 1927.

Truck manufacturers are adopting LOCKHEED HYDRAULIC 4-wheel brakes

**—because Lockheed
Hydraulics fully meet today's
road and driving conditions,
and thus solve completely
and finally the great problem
of making a truck safe under
heavy load and at high speed.**

**That is why
the three leading trucks have
adopted LOCKHEED HYDRAULICS**

HYDRAULIC BRAKE COMPANY, DETROIT, MICHIGAN, U. S. A.

*The Commercial Car Journal
and Operation & Maintenance*

April, 1929

Graham Tells Operators How to Cut Costs

"The greatest opportunity the operator has to bring down unit costs lies in the efficient control of variable elements, such as tires, maintenance, gasoline, oil, etc.," declared L. A. Graham, general sales manager, Relay Motors Corp., before approximately 250 truck operators assembled in the salesroom of Mueller Brothers, Pittsburgh, Pa., distributor of Relay and Garford trucks, March 26. Charts were used to show how reductions in operating charges over a given period of time affected profit with vehicles having the same first cost as well as with vehicles of higher first costs. Mr. Graham also explained by means of his charts and lantern slides the principle of the Relay Drive and how its ability to cushion horizontal impacts and provide to-and-fro flexibility increased tire life, favorably affected fuel consumption and lowered maintenance expense because of reduced chassis hammering.

Hudson Plans to Build Trucks

Hudson Motor Car Co. will introduce a line of light delivery commercial vehicles about July 1, according to a statement issued by the factory.



Sam C. Mitchell

The trucks, based on the Essex chassis, will be marketed through the present Hudson-Essex distributor and dealer organization. Sam C. Mitchell, for several years a Hudson executive, will handle the distribution as truck manager.

Chrysler Promotes Cooney

A. E. Cooney, general manager of the Dodge Brothers truck plant at Evansville, Ind., has been promoted to plant manager of three Chrysler-Dodge units, at Detroit, Stockton, Cal., and Evansville.

Harris Joins Erie Malleable

Ernest W. Harris has joined the Automotive Wheel Division, Erie Malleable Iron Works, as executive engineer. He was formerly chief engineer, Eaton Axle & Spring Co.

Timken Earnings, \$13,730,145

H. H. Timken, president, Timken Roller Bearing Co., reports that in face of expenditures of more than \$8,300,000 for new buildings and equipment, net profits for 1928 were \$13,730,145.

Reo Uses Chrome Nickel

Cylinder blocks of the Gold Crown engine used in the new line of Reo trucks are made of chrome-nickel alloy iron. The new material has seven times the endurance of ordinary close-grained iron, according to statement by the

Reo Motor Car Co. and its use will reduce valve grinding, valve seat wear and improve lubrication.

Full-floating type rear axles are embodied in the GA, GC, GD trucks and GB bus chassis, described in the March issue. These models were incorrectly listed as having semi-floating rear axles.

Ward La France Refinances

Ward La France Truck Corp., N. Y., manufacturer of motor trucks, recently issued 15,000 shares of no par, voting stock to extend the activities of the corporation and for general corporate purposes. According to balance sheet ratio of current assets to current liabilities is 8.5 to 1 and working capital is \$456,667.83. Management and personnel is unaffected by the action.

G. M. Buys German Plant

General Motors Corp. has formed an association with the Adam Opel Co., Russelsheim, Germany, through the taking over of a substantial interest in that company at a cost approximately of \$30,000,000, according to Alfred P. Sloan, Jr. Opel plants rank favorably in size with General Motors plants in this country.

Biggest First Quarter

Manufacturers of automotive parts and equipment have had the greatest first quarter in the history of the industry, according to the Motor and Equipment Association. Wholesalers of service parts, accessories and shop equipment likewise enjoyed better business than last.

Federal Net Shows Increase

Federal Motor Truck Co. reports 1928 net profits, after charges and Federal taxes, of \$550,588. This compares with 1927 net profit of \$447,556.

Mack Net Keeps Pace

Mack Trucks, Inc., and subsidiaries report net profit for 1928 after all charges as \$5,915,301, which compares with \$5,844,306 for 1927. Total sales for the year were \$55,850,860 against \$55,270,294 for 1927.

Mosher Named Sales Manager

Allen Mosher has been appointed sales manager of the Fargo Motor Corp. of Canada, Ltd., according to J. D. Mansfield, president and general manager.

Coming Events

SHOWS

Chicago—Motor & Equipment Assn. Nov. 4-9
Detroit—National Standard Parts Assn. Nov. 11-16
Cincinnati—Hotel Gibson—National Battery Mfgs. Assn. April 24-26

CONVENTIONS

Chicago—Hotel Stevens—National Highway Traffic Assn. May 13-15
Chicago—National Safety Congress Sept. 30-Oct. 4
Detroit—National Standard Parts Assn. Nov. 11-16
Saranac Lake—S.A.E. Summer Meeting June 25-28

Manufacturers Form Marketing Cooperative

Organization of 32 independent manufacturers and distributors of tractors, bodies, farm implements and industrial equipment in a cooperative manufacturing marketing and financing movement, with combined assets of more than \$125,000,000 was announced by Milton W. Anderson, president and general manager of the company. The company will be known as the United Tractor & Equipment Corp. A full line of equipment will be marketed through several hundred dealers.

Ruthenberg Leaves G. M. T.

Louis Ruthenberg has resigned as vice-president and assistant general manager of the General Motors Truck Co. to become president and general manager of Copeland Products, Inc., manufacturer of mechanical refrigerators. Mr. Ruthenberg has been associated with General Motors Corp. since 1912 when he became assistant chief engineer. Among the offices held by him during this period were general superintendent, manager of manufacturing, general manager of the Yellow Sleeve Valve Engine Works, supervisor of the erection of the Pontiac plant.



Louis Ruthenberg

D'Arcy Cleveland Branch

The D'Arcy Advertising Co., of St. Louis, has opened a branch in Cleveland, with John Young Brown, Jr., in charge. This arrangement enables D'Arcy to maintain closer contacts with its General Tire and White Motor Co. accounts.

Hercules Bodies Buys Plant

Hercules Bodies, Inc., Evansville, Ind., has purchased the plant and equipment of the Bockstege Furniture Co., which will afford 113,000 additional square feet for body building operations, according to George K. Specht, vice-president.

Charles Fillmore Mellish

Charles Fillmore Mellish, 72, secretary and director of the Federal Motor Truck Co., died of heart trouble. Mr. Mellish was one of the founders of the Federal Motor Truck Co.

Motor Wheel Elects Harper

Harry F. Harper has been reelected president and general manager of the Motor Wheel Corp.

New Records for Stewart

Sales of Stewart trucks for the first two months of 1929 show an increase of 54 per cent over same months in 1928, according to T. R. Lippard, president.

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

These Chassis Which Are Sold and Recommended for Bus Use Are Designated in the Following Table by Reference Sign (\$) in Front of the Name

For Motor Bus Chassis See Pages 76 and 77

* Changes

† New Models

(Where prices are not given it is because we have been unable to get them from authoritative sources)

Key of abbreviations, page 78

Trade Name and Model	General			Engine					Electrical System		Clutch	Gearset		Rear Axle		Gear Ratios		Front Axle Make and Model	Steering Gear (Make)	Standard Wheelbase		Chassis Price						
	Standard Wheelbase (Inches)	Maximum Wheelbase (Inches)	Tire Size	Make and Model	Number of Cylinders	N.A.C.C. Rated H.P.	Valve Arrangement	Oiling System	Governor (Make)	Radiator (Make)		Fuel System		Ignition System (Make)	Generator and Starter (Make)	Type and Make	Make and Model			Location	Universals (Make)		Make and Model		Type	Total Reduction in High	Total Reduction in Low	Brakes, Location
												Carburetor (Make)	Fuel Feed															
1000 Pounds																												
Chevrolet Int. Com.	400	107	B 4.50/20 B 4.50/20	Ow	6-3 1/2 x 3 1/2	26.3 L	H	PG	Non	Har	Car	P	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	1815	75 1/2	30 1/2	13.88	17.4	E	Hand		
Dodge Brothers SE.	665	110	B 29x5.00 B 29x5.00	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	McC	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	1965	75 1/2	30 1/2	15.23	17.4	G	Hand		
Dodge Brothers SEW.	675	110	B 31x5.25 B 31x5.25	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	McC	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	1965	75 1/2	30 1/2	16.16	17.4	G	Hand		
Durand Com. Ch.	495	107	B 28x4.75 B 28x4.75	Con	4-3 1/2 x 4 1/2	18.2 L	L	PC	Non	Fed	Til	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	1650	84	86	4.87	17.4	G	Hand		
Fargo Packet.	645	107	B 4.75/20 B 4.75/20	Ow	6-3 1/2 x 3 1/2	26.3 L	L	PC	Non	Lon	Car	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	1855	84	86	4.7	17.4	E	Hand		
General Motors T-11.	625	109 1/2	B 5.00/19 B 5.00/19	Pontiac	6-3 1/2 x 3 1/2	26.3 L	L	PC	Non	Lon	Car	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	1855	84	86	4.2	17.4	E	Hand		
Reo Speed Wagon Jr.	895	115	B 28x5.25 B 28x5.25	Con 16E	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Har	Sch	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	2290	84	86	14.67	17.4	E	Hand		
Stud. Erskine 82B.	675	109	B 30x5	Con 9F	6-2 3/4 x 4 1/2	18.2 L	L	PC	Non	Lon	Sch	V	D-R	D-R	D. Lon	Ow	Int.	Ow	Ow	2290	84	86	15.6	17.4	H	Hand		
1500 Pounds																												
Dodge Brothers DE	775	120	B 31x5.25 B 31x5.25	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Fed	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	2510	75 1/2	30 1/2	17.4	17.4	G	Hand		
Dodge Brothers DEF	830	120	B 33x5 1/2 B 33x5 1/2	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Fed	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	2680	75 1/2	30 1/2	17.4	17.4	G	Hand		
Dodge Brothers DEW	790	120	B 5.50/18 B 5.50/18	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Fed	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	2680	75 1/2	30 1/2	17.4	17.4	G	Hand		
Fargo Clipper.	725	124	B 30x5.50 B 30x5.50	Wau XA	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Ow	Str	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	2175	84	86	15.1	17.4	H	Hand		
Int. Harvester Spec. Del.	1170	121	B 30x5.50 B 30x5.50	Con	6-3 1/2 x 3 1/2	19.8 L	L	PC	Non	Fed	Ste	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	2200	84	86	4.9	17.4	H	Hand		
Kleber.	1170	121	B 30x5.50 B 30x5.50	Con	6-3 1/2 x 3 1/2	19.8 L	L	PC	Non	Fed	Ste	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	2200	84	86	4.9	17.4	H	Hand		
Rugby Fast Mail.	725	110	B 28x5.00 B 28x5.00	Con 31L	6-3 1/2 x 3 1/2	19.8 L	L	PC	Non	Fed	Ste	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	1760	75 1/2	30 1/2	22.3	22.3	G	Hand		
Sandor S.	1200	130	B 30x5.50 B 30x5.50	Lye	6-2 3/4 x 4 1/2	19.8 L	L	PC	Non	Fed	Ste	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	2550	75 1/2	30 1/2	5.37	22.3	G	Hand		
Stewart Buddy.	895	118	B 30x5.50 B 30x5.50	Lye	6-2 3/4 x 4 1/2	19.8 L	L	PC	Non	Fed	Ste	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	2684	75 1/2	30 1/2	5.37	22.3	G	Hand		
Vale.	1165	112	B 30x5.25 B 30x5.25	Ow	6-3 1/2 x 4 1/2	24.4 H	H	FP	Non	Ow	Str	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	2352	54	54	17.3	17.3	F	Hand		
1 Ton																												
Amco 14.	125	125	P 30x5	Con H8	4-3 1/2 x 4 1/2	18.2 L	L	PC	Non	Per	Til	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	2650	96	47	5.66	20.1	A	Ros		
Amco 16.	125	125	P 30x5	Con 20L	6-27 1/2 x 4 1/2	19.8 L	L	PC	Non	Chi	Til	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	2650	96	47	5.66	20.1	A	Ros		
Amco 20P.	1185	132	B 32x6.00 B 32x6.00	Bud WTV	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Chi	Til	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3250	96	47	4.5	20.1	A	Ros		
Beta 13-6.	153	140	P 32x6	Bud H56	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Chi	Til	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3250	96	47	4.5	20.1	A	Ros		
Biederman.	138	138	P 30x5	Con 8L	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Ow	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3200	96	47	4.5	20.1	A	Ros		
Clydesdale 16.	140	140	P 34x5	Con 8L	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Ow	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3200	96	47	4.5	20.1	A	Ros		
Commer 20Y.	1345	131	P 30x5	Bud H56	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Ow	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3900	103 1/2	63	5.1	25.5	E	Ros		
Day-Elder MF.	1600	142	P 30x5	Con 16C	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	G&O	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3100	103 1/2	63	5.83	25.5	E	Ros		
Denby 41.	128	128	P 34x5	Con 18E	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	G&O	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3315	96	47	5.12	18.6	G	Ros		
Diamond T51.	1095	132	P 30x5	Con 18E	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	G&O	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3200	96	47	5.12	18.6	G	Ros		
Dodge Brothers BE.	995	130	P 30x5	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Fed	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	2920	85 1/2	49 1/2	23.76	23.76	G	Ros		
Dodge Brothers BEW.	1030	130	P 33x5	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Fed	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	2950	85 1/2	49 1/2	26.40	26.40	G	Ros		
Dodge Brothers IEF.	1110	140	P 32x6	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Fed	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	2965	85 1/2	49 1/2	26.40	26.40	G	Ros		
Dodge Brothers BEF.	1040	130	P 32x6	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Fed	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	2965	85 1/2	49 1/2	26.40	26.40	G	Ros		
Dodge Brothers IE.	1055	140	P 30x5	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Fed	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	2955	85 1/2	49 1/2	26.40	26.40	G	Ros		
Dodge Brothers LEW.	1100	140	P 33x5	Ow	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Fed	Ste	V	N-E	N-E	P. B&B	Ow	Int.	Ow	Ow	2985	85 1/2	49 1/2	26.40	26.40	G	Ros		
Federal Scout.	123	123	P 30x5	Con 34L	6-3 1/2 x 3 1/2	19.8 L	L	PC	Non	Lon	Zen	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	2500	91	51	5.85	22.3	G	Ros		
Fisher Jr. Express.	123	123	P 30x5	Wau X	6-3 1/2 x 3 1/2	19.8 L	L	PC	Non	Lon	Zen	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	2500	91	51	5.85	22.3	G	Ros		
Gardner 20Y.	1000	142	P 30x5	Bud H56	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Lon	Zen	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	2500	91	51	5.85	22.3	G	Ros		
General Motors T-19.	895	127 1/2	P 6.50/20	Con 31L	6-3 1/2 x 3 1/2	19.8 L	L	PC	Non	Lon	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	2500	91	51	5.85	22.3	G	Ros		
Gramm 263N.	1485	135	P 32x6	Pontiac	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Lon	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	2500	91	51	5.85	22.3	G	Ros		
Gramm-Bernstein 10.	129	129	P 30x5	Lyc 8	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Ow	Mar	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	2800	103 1/2	73 1/2	25.5	25.5	E	Ros		
Hahn 84.	138	138	P 30x5	Lyc CT	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Ow	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3100	97	57 1/2	6.14	34.11	E	Ros		
Hahn 86.	138	138	P 30x5	Lyc CT	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Ow	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3100	97	57 1/2	6.14	34.11	E	Ros		
Indiana 200.	137	137	P 30x5	Bud H56	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	G&O	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3200	103	63 1/2	5.85	23.08	A	Ros		
Int. Harv tr 6 Sp. Spec.	124	124	P 30x5	Wia F	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	G&O	Zen	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3200	103	63 1/2	5.85	23.08	A	Ros		
Kaiser.	140	140	P 34x5	Ow	6-3 1/2 x 3 1/2	24.1 L	L	SP	Non	McC	Str	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	3780	96	56	5.33	21.8	A	Ros		
Kleber.	1460	140	P 30x5	Con	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	McC	Str	V	D-R	D-R	P. B&B	Ow	Int.	Ow	Ow	3780	96	56	5.33	21.8	A	Ros		
Larabee 20.	143	143	P 30x5	Con 16C	6-3 1/2 x 3 1/2	27.3 L	L	PC	Non	Per	Til	V	A-L	A-L	P. B&B	Ow	Int.	Ow	Ow	3740	96	54	5.16	18.88	A	Ros		

Key of abbreviations, page 78

Trade Name and Model	General			Engine					Electrical System		Clutch	Gearset		Rear Axle		Gear Ratios		Front Axle Make and Model	Steering Gear (Make)	Standard Wheelbase					
	Chassis Price	Maximum Wheelbase (Inches)	Tire Size	Make and Model	Number of Cylinders	N.A.C.C. Rated H.P.	Valve Arrangement	Oiling System	Governor (Make)	Radiator (Make)		Fuel System		Ignition (Make)	Generator and Starter (Make)	Type and Make	Make and Model			Final Drive	Type	Total Reduction in High	Total Reduction in Low	Cab to rear of frame	Cab to rear axle
												Carburetor	Fuel Feed												
1 Ton—Cont'd																									
Le Moon H10.....	1500	130	P 30x5	Con 16C	6-34x4 1/2	27.3	L	FP	Non	Chi	Str	D-R	D-J	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3000	66			
Loedinghaus.....	1300	130	P 30x5	Wau V	4-4x5	25.6	L	PC	Non	Lon	Zen	G	A-L	D-B-L	Tim 5200	R	5.14	25.7	Ros	120	2850	72			
Relay 20B.....	1700	142	P 30x5	Bud H56	6-34x4 1/2	27.3	L	PC	Non	Har	Zen	V	A-L	W-G	Own	E	5.22	18.4	Ros	72	4100	63			
Reo DA.....	995	123	P 30x5	Con 16E	6-34x4 1/2	27.3	L	PC	Non	Har	Sch	V	N-E	P-B&B	Own	E	5.22	18.4	Ros	63	2755	63			
Reo DC.....	1075	138	P 30x5	Con 16E	6-34x4 1/2	27.3	L	PC	Non	Har	Sch	V	N-E	P-B&B	Own	E	5.22	18.4	Ros	63	2755	63			
Rugby Exp.....	975	128	P 30x5	Con 31L	6-24x4 1/2	18.2	L	PC	Non	Fed	Til	V	A-L	Own	Sal	E	5.39	22.4	Ros	63	2510	63			
Sanford A.....	1000	130	P 30x5	Bud H56	6-24x4 1/2	19.8	L	PC	Non	Fed	Til	V	A-L	Own	Sal	E	5.39	22.4	Ros	63	2510	63			
Service 20Y.....	1090	142	P 30x5	Wau X	6-34x4 1/2	27.3	L	PC	Non	Fed	Til	V	A-L	Own	Sal	E	5.39	22.4	Ros	63	2510	63			
Stewart Buddy.....	495	128	P 30x5	Bud H56	6-24x4 1/2	19.8	L	PC	Non	Fed	Til	V	A-L	Own	Sal	E	5.39	22.4	Ros	63	2510	63			
Studebaker GD-N.....	1075	140	P 30x5	Own X	6-34x4 1/2	27.3	L	PC	Non	Fed	Til	V	A-L	Own	Sal	E	5.39	22.4	Ros	63	2510	63			
United 16C.....	1225	132	P 32x4 1/2	Con 29L	4-34x4 1/2	19.8	L	PC	Non	Per	Til	V	A-L	P-B&B	W-G T 71	W-G	5.6	17.1	Ros	103 1/2	3890	47			
United 18C.....	1225	132	P 32x4 1/2	Bud WTU	4-34x4 1/2	19.8	L	PC	Non	Per	Til	V	A-L	P-B&B	W-G T 71	W-G	5.6	17.1	Ros	103 1/2	3890	47			
U. S. U.....	1850	133	S 34x5	Con 29L	4-34x4 1/2	19.8	L	PC	Non	Per	Til	V	A-L	P-B&B	W-G T 71	W-G	5.6	17.1	Ros	103 1/2	3890	47			
Wachusett S.....	152	162	P 30x5	Bud WTU	4-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	P-B&B	W-G T 71	W-G	5.6	17.1	Ros	103 1/2	3890	47			
White 15B.....	1545	133 1/2	P 30x5	Own GKA	4-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	P-B&B	W-G T 71	W-G	5.6	17.1	Ros	103 1/2	3890	47			
White 60.....	1850	138	P 30x5	Own 2A	6-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	P-B&B	W-G T 71	W-G	5.6	17.1	Ros	103 1/2	3890	47			
Willys Knight T-100.....	1850	130	P 30x5	Own	6-24 1/2 x 4 1/2	20.7	X	FP	Non	Own	Til	V	A-L	P-B&B	W-G T 71	W-G	5.6	17.1	Ros	103 1/2	3890	47			
1 1/4 Ton																									
Aberbury 26B.....	132	132	P 30x5	Lyc S	6-34x4 1/2	25.3	L	PC	Non	Fed	Zen	G	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	98 1/2	3350	55			
Biederman.....	154	134	P 32x6	Con 18E	4-4x5	25.6	L	PC	Non	Lon	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	104	3100	56			
Brookway Junior.....	130	130	P 30x5	Wau V	4-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Brookway 20B.....	137	137	P 30x5	Bud WTU	4-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Clinton 20B.....	150	150	P 30x5	Bud WTU	4-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Cleveland 10A.....	154	154	P 30x5	Bud WTU	4-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Corbett 620.....	137	137	P 32x6	Con 18E	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Cordwell 10A.....	134	134	P 30x5	Bud WTU	4-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Fagel 100.....	1300	156	P 32x6 1/2	Wau X	6-34x4 1/2	27.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Goldfreedson B24.....	131	131	P 30x5	Bud WTU	4-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Gramm Burnstein 10.....	1485	133	P 30x5	Lyc CT	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Indiana 11X.....	120	120	P 30x5	Her OX	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Indians 11.....	120	120	P 30x5	Her OX	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Ink. Harvester S-24.....	130	130	P 30x5	Lyc CT	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Ink. Harvester S-26.....	130	130	P 30x5	Lyc CT	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Master 11.....	132	132	P 30x5	Bud WTU	4-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Moreland Ane.....	134	134	P 30x5	Bud WTU	4-34x4 1/2	22.5	L	PC	Non	G&O	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Republic 75-6.....	128 1/2	128 1/2	P 30x5	Lyc CT	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Republic 75.....	128 1/2	128 1/2	P 30x5	Lyc CT	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Sandford S.....	120	120	P 30x5	Con 18E	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Selden Facemaker 25.....	142	142	P 30x5	Con 18E	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Sterling DB7.....	137	137	P 30x5	Con 18E	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Stewart 10.....	1295	130	P 30x5	Lyc CT	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Stewart 16.....	1295	130	P 30x5	Lyc CT	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
United 20C.....	128	128	P 30x5	Her OX	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
United 20C.....	128	128	P 30x5	Her OX	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Valley.....	1295	132	P 30x5	Her OX	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Victor 30.....	1595	131	P 30x5	Con 18E	6-34x4 1/2	25.3	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
White 57.....	2725	140	P 32x6	Own GRC	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Woods 20B4.....	129	129	P 30x5	Bud WTU	4-34x4 1/2	22.5	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Woods 20B6.....	129	129	P 30x5	Con 31L	6-27x4 1/2	19.7	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
1 1/2 Ton																									
Acme 24.....	144	144	P 30x5	Con 16C	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Acme 26.....	144	144	P 30x5	Con 16C	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Acorn 30.....	2300	144	P 30x5	Con 16C	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Acorn 30-P.....	2300	144	P 30x5	Con 16C	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Armstrong 30B.....	187	187	P 30x5	Her OX	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100	56			
Armstrong 30B.....	187	187	P 30x5	Her OX	4-4x5	25.6	L	PC	Non	Per	Zen	V	A-L	D-B-L	Cla B365	B	5.6	18.7	Ros	96	3100				

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1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	1496	1497	1498	1499	1500	1501	1502	1503	1504	1505	1506	1507	1508	1509	1510	1511	1512	1513	1514	1515	1516	1517	1518	1519	1520	1521	1522	1523	1524	1525	1526	1527	1528	1529	1530	1531	1532	1533	1534	1535	1536	1537	1538	1539	1540	1541	1542	1543	1544	1545	1546	1547	1548	1549	1550	1551	1552	1553	1554	1555	1556	1557	1558	1559	1560	1561	1562	1563	1564	1565	1566	1567	1568	1569	1570	1571	1572	1573	1574	1575	1576	1577	1578	1579	1580	1581	1582	1583	1584	1585	1586	1587	1588	1589	1590	1591	1592	1593	1594	1595	1596	1597	1598	1599	1600	1601	1602	1603	1604	1605	1606	1607	1608	1609	1610	1611	1612	1613	1614	1615	1616	1617	1618	1619	1620	1621	1622	1623	1624	1625	1626	1627	1628	1629	1630	1631	1632	1633	1634	1635	1636	1637	1638	1639	1640	1641	1642	1643	1644	1645	1646	1647	1648	1649	1650	1651	1652	1653	1654	1655	1656	1657	1658	1659	1660	1661	1662	1663	1664	1665	1666	1667	1668	1669	1670	1671	1672	1673	1674	1675	1676	1677	1678	1679	1680	1681	1682	1683	1684	1685	1686	1687	1688	1689	1690	1691	1692	1693	1694	1695	1696	1697	1698	1699	1700	1701	1702	1703	1704	1705	1706	1707	1708	1709	1710	1711	1712	1713	1714	1715	1716	1717	1718	1719	1720	1721	1722	1723	1724	1725	1726	1727	1728	1729	1730	1731	1732	1733	1734	1735	1736	1737	1738	1739	1740	1741	1742	1743	1744	1745	1746	1747	1748	1749	1750	1751	1752	1753	1754	1755	1756	1757	1758	1759	1760	1761	1762	1763	1764	1765	1766	1767	1768	1769	1770	1771	1772	1773	1774	1775	1776	1777	1778	1779	1780	1781	1782	1783	1784	1785	1786	1787	1788	1789	1790	1791	1792	1793	1794	1795	1796	1797	1798	1799	1800	1801	1802	1803	1804	1805	1806	1807	1808	1809	1810	1811	1812	1813	1814	1815	1816	1817	1818	1819	1820	1821	1822	1823	1824	1825	1826	1827	1828	1829	1830	1831	1832	1833	1834	1835	1836	1837	1838	1839	1840	1841	1842	1843	1844	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	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Electric Commercial Cars

Name and Model Number	Total Weight Resting on Four Tires	Chassis Weight—Exclusive of Battery	Minimum Load Capacity	Maximum Load Capacity	Chassis Price	Maximum Speed	Location of Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Spring	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent of Weight on Rear Wheels
O. B-B.						13			G-E	Own		C	D		S 36x4	DS36x3½	Own	107	
O. B-C.						11			G-E	Own		C	D		S 36x5	DS36x4	Own	135	
O. B-D.						10			G-E	Own		C	D		S 36x6	DS36x5	Own	143	
Walker 10		2400		1500	1750	14	H&S	60	G-E	Own	4	S	Cl	Mat	S 32x3½†	S 32x4†	Ros	108°	66
Walker 20		3200	1500	2000	2450	15	A	50	Wes	Own	5	Own	Own	Mat	S 34x3½	S 36x4	Ros	94°	66
Walker 25		3500	2000	3000	2550	14	A	50	Wes	Own	5	Own	Own	Mat	S 34x4	S 36x5	Ros	101°	66
Walker 45		4400	4000	5000	3300	14	A	50	Wes	Own	5	Own	Own	Mat	S 36x4	S 36x6	Ros	114°	66
Walker 50		4800	5000	6000	3450	13	A	50	Wes	Own	5	Own	Own	Mat	S 36x5	S 36x8	Ros	126°	66
Walker 65		7000	7000	9000	4350	11	A	50	G-E	Own	5	Own	Own	Mat	S 36x5	DS40x5	Ros	131°	66
Walker 75		7800	10000	14000	4500	10	A	50	G-E	Own	5	Own	Own	Mat	S 36x6	DS40x6	Ros	141°	66
Ward B.	6500	2300				14	S		•	Own	4	W	Own	Eat	P 30x5	P 30x5	Ros	91	
Ward C.	8400	2850				13	S		•	Own	4	W	Own	Eat	P 30x5	P 32x6	Ros	96	
Ward E.	13000	4100				12½	A		•	Own	4	W	Wis	Eat	S 34x5	S 36x7	Ros	114	
Ward G.	17000	4950				11	A		•	Own	5	W	Wis	Eat	S 36x8	S 36x8	Ros	128	
Ward K.	25000	7750				10	A		•	Own	5	W	Wis	Eat	S 36x6	S 36x10	Ros	160	
Ward KS.	30000	8075				9½	A		•	Own	5	W	Wis	Eat	S 36x7	DS36x7	Ros	160	

NOTE: Battery Equipment on all above makes is at the option of the purchaser. Battery Location Abbreviations: A-amidships; H-under hood; and S-under seat. *G-E or Wes

KEY OF ABBREVIATIONS

For addresses of manufacturers listed below see Chilton Catalog and Directory

Wheelbase
 *More than one wheelbase furnished.
Tires
 B—Balloons.
 P—Pneumatics standard equip.
 DP—Dual pneumatics standard equipment.
 S—Solids.
 DS—Dual solids.
 *—Tires at extra cost.
 †—Pneumatics can be furnished at extra cost.
Engine
 *Models also furnished with engine under seat.
 Bud—Buda Co.
 Con—Continental M. Corp.
 D—Head and Side.
 FP—Full Pressure to all bearings including wrist pins.
 H—Overhead.
 HaS—American Car & Fdy. Co.
 Her—Hercules Motor Corp.
 I—In Head.
 Jackson—Master M. T. Mfg. Co.
 L—L-Head.
 Lyc—Lycoming M. Corp.
 PC—Pressure to all crankshaft and connecting-rod bearings.
 PG—Pump, Gravity & Splash.
 PS—Pressure with splash.
 SP—Circulating splash.
 T—T-Head.
 Wau—Waukesha M. Co.
 Wis—Wisconsin M. Mfg. Co.
 Yell—Yellow Sleeve V. E. Wks.
 X—Sleeve.
Governor
 Dup—Elsemann Magneto Corp.
 Han—Handy Gov. Co.
 K. P.—Handy Gov. Co.
 McC—E. R. Klemm.
 Mon—Monarch Gov. Co.
 Non—Not Supplied.
 Pha—Bethlehem Fabricators, Inc.
 Pie—Pierce Governor Co.
 Slim—Elsemann Magneto Corp.
 Wau—Waukesha M. Co.

Radiator
 Bow—Bowerbank, E. R. Co.
 Bus—Bush Mfg. Co.
 Chi—Chicago Mfg. Co.
 Fed—Fedders Mfg. Co.
 G&O—G. & O. Mfg. Co.
 Har—Harrison Rad. Corp.
 Lon—Long Mfg. Co.
 McC—McCord Rad. & Mfg. Co.
 McK—McKinnon Dash Co.
 Mod—Modine Mfg. Co.
 Per—Perfex Corp.
 R-T—Rome-Turney Rad. Co.
 U. S.—U. S. Cartridge Co.
 You—Young Rad. Co.
Fuel System
 B.B.—Penberthy Injector Co.
 Car—Carter Carburetor Co.
 E—Electric Pump.
 G—Gravity.
 Mar—Marvel Carburetor Co.
 O—Mechanical Pump.
 P—Pressure.
 Sch—Wheeler Schebler Car. Co.
 Ste—Detroit Lubricator Co.
 Str—Stromberg Motor Dev. Co.
 Til—Tillotson Mfg. Co.
 V—Vacuum.
 Zen—Zenith-Detroit Corp.
Electrical Systems
 †—Generator & Starter at Extra Cost.
 †—Starter not supplied, Generator at Extra Cost.
 *—Starter at Extra Cost.
 A-L—Electric Auto-Lite Corp.
 Apo—Apollo Magneto Corp.
 Bos-A—Am. Bosch Magneto Co.
 Bos-R—Rob. Bosch Magneto Co.
 Con—Conn. Tel. & Elec. Co.
 DJ—DeJon Elec. Corp.
 D-R—Delco-Remy Co.
 Dyn—Owen Dyneto Corp.
 Eis—Elsemann Magneto Corp.
 Exl—Electric S. B. Co.
 Gor—R. J. Gorman Co., Inc.
 L-N—Leece-Neville Co.

Clutch and Gearset
 *—Other ratios optional.
 †—Auxiliary two-speed transmission optional.
 A—Amidships.
 B & B—Borg & Beck Co.
 B-L—Brown-Lipe Gear Co.
 Cot—Cotta Trans. Corp.
 Cov—Covert Gear Co.
 Det—A. J. Detlaff Co.
 D-G—Detroit Gear & Mach. Co.
 D-Disk.
 Ful—Fuller & Sons Mfg. Co.
 H-S—Merchant & Evans Co.
 J—Unit with Jackshaft.
 K—Cone.
 Lon—Long Mfg. Co.
 M. M.—Mechanics Mach. Co.
 Mun—Muncie Products Div. General Motors Corp.
 O—Disk in Oil.
 P—Plate.
 Roc—Rockford Drill. Mach. Co.
 U—Unit with Engine.
 W-G—Warner Gear Co.
 Yell—Yellow Sleeve V. E. Wks.
Universal
 B.G.—Universal Machine Co.
 Blo—Blood Bros. Mach. Co.
 Cle—Cleveland St. Prod. Corp.
 Har—Spicer Mfg. Co.
 M-E—Merchant & Evans Co.
 M. M.—Mechanics Machine Co.
 Pet—Cleveland Univ. Parts Co.
 Pic—Pick Mfg. Co.
 Spi—Spicer Mfg. Co.
 The—Thermoid Rubber Co.
 U-M—Universal Machine Co.
 U-P—Universal Products Co.

Front and Rear Axles
 *—Two speed.
 ½—Semi-Floating.
 ¾—Three-Quarter Floating.
 B—Straight Bevel.
 Cla—Clark Equip. Co.
 Col—Columbia Axle Co.
 Con—Continental Axle Co.
 C—Chain.
 D—Dead.
 Eat—Eaton Axle Co.
 F—Floating.
 I—Internal Gear.
 R—Double Reduction.
 S—Spiral Bevel.
 Sal—Salisbury Axle Co.
 She—Sheldon Axle & Spring Co.
 Shu—Shuler Axle Co., Inc.
 Tim—Timken Det. Axle Co.
 Tor—Eaton Axle & Spring Co.
 W—Worm.
 Wis—Timken Det. Axle Co.
Brake
 A—Rear Wheels only.
 B—Driveshaft and Rear Wheels.
 D—Jackshaft and Rear Wheels.
 E—4-Wheel Brakes.
 F—4-Wheel Brakes with emergency on jackshaft.
 G—4-Wheel Brakes with emergency on driveshaft.
 H—4-Wheel Brakes with emergency on rear wheels.
Service Brake Type
 *—Mechanical.
 †—Hydraulic.
 †—Vacuum Booster.
 *Compressed Air.
Steering Gear
 CAS—Columbus G. & P. Co.
 D-G—Detroit Gear & Mach. Co.
 Dod—Dodge Bros. Co.
 Gem—Gemmer Mfg. Co.
 Han—Hannum Mfg. Co.
 Jac—Saginaw Steering Gear Div. General Motors Corp.
 Lav—Hannum Mfg. Co.
 Ros—Ross Gear & Tool Co.

Spoksteel by Motor Wheel

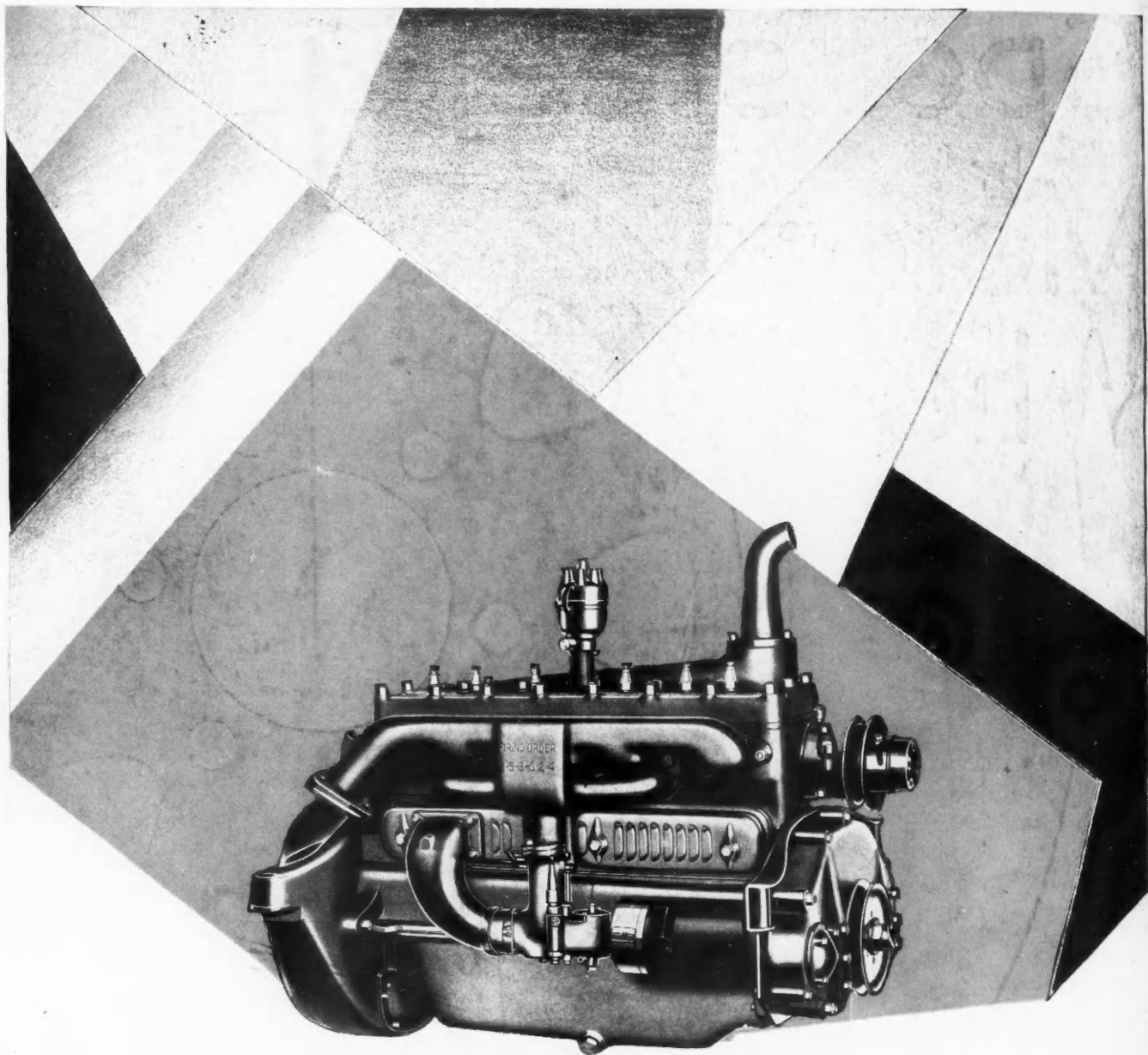


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MOTOR WHEEL CORPORATION, LANSING, MICHIGAN



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